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VICTORIAN NATURALIST:

THE JOURNAL & MAGAZINE

OF THE

Field Naturalists' Club of Victoria.

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The Author of each Article is responsible for the facts and opinions he records.

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THE

Victorian Naturalist.

Vol. XI.—No. 1. APRIL, 1894. No. 125.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held in the Royal Society's Hall on Monday evening, 9th April, 1894. The President, Mr. H. T. Tisdall, F.L.S., occupied the chair, and there was an attendance of some 50 members and friends.

REPORT OF EXCURSION.

A report of the excursion to Bacchus March on Easter Monday was received from the leader, Mr. C. C. Brittlebank. The party visited the Werribee Gorge and inspected the evidences of glaciation recently discovered there.

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that the usual meeting for practical work was held on 19th March, when there was a moderate attendance. The course in botany was continued, Mr. Shephard taking as his type the yeast plant.

ELECTION OF MEMBER.

On a ballot being taken, Mr. J. Prescott was duly elected a member of the Club.

GENERAL BUSINESS.

A letter was read from Mr. H. R. Hogg, asking the Club to accept nine folio volumes of Victorian plants for the use of members for reference. A unanimous vote of thanks was accorded Mr. Hogg for his valuable gift.

PAPER READ.

By Mr. T. S. Hall, M.A., entitled "What is a Graptolite?" The question was answered by referring these interesting fossils to the free-swimming Hydrozoa. The author briefly defined the different groups into which graptolites are divided, and exhibited a number of diagrams and specimens in illustration of his remarks.

Professor Spencer considered it more likely that they were fixed Hydrozoa, and drew attention to the practical advantages of a complete study of these forms in the determination of auriferous strata.

NATURAL HISTORY NOTES.

A note was read by Mr. G. A. Keartland on "Our Neighbouring Naturalists." During recent visits to Adelaide and Sydney Mr. Keartland visited several old friends and gained many new ones. The result, as shown at the meeting, was a considerable accession to his collection.

Two cuttings were contributed by Mr. R. S. Sugars—one recommending boracic acid as a preservative for bird skins, and the other on some recent experiments made at the Plymouth Marine Biological Laboratory to decide the action of light on the

white undersides of flat-fish. It was found that if light be reflected from below the undersides gradually became spotted, and finally dark all over.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening :—By Mr. F. G. A. Barnard.—Geological specimens from Bacchus Marsh excursion, and geological map of district. By Mr. J. Gabriel.—Egg of Great Wandering Albatros, *Diomedia exsulans*, and Hydroid, *Ceratella fusca*, in spirit. By Mr. G. A. Keartland. —Eggs obtained during recent trips to Adelaide and Sydney, including Megapode, *Megapodus tumulus*, Macleay's Kingfisher, *Halcyon Macleayi*, Phaeton Finch, *Estrilda phaeton*, Great-billed Gerygone, *Gerygone magnirostris*, White-fronted Gerygone, *G. albigularis*, Rock Parrakeet, *Euphema petrophila*, Bauer's Parrakeet, *Platycercus Bauerii*, and many others ; also pair of Cockatoo Parrakeets, *Calopsittacus Novæ-Hollandiæ*, bred in captivity by Mr. Mellor, of Adelaide. By Baron von Mueller, K.C.M.G.—*Pimelea Treyvaudi*, new to science, collected by Mr. H. Treyvaud, at Cudgewa, Upper Murray River ; also *Asplenium bulbiferum*, with unusually large growth, collected by C. French, jun., at Strezlecki Range, South Gippsland. By Mr. F. P. Spry.—Two cases of Australian Lepidoptera. By Mr. G. Sweet.—Fossil flora from the Leigh's Creek coal formation, south-west of Lake Eyre, South Australia, obtained during a recent visit to that locality, including *Thinnfeldia media*, *T. odontopteroides*, *Phyllopteris feismantelli*, *Macrotæniopteris wianamattæ*, *Tæniopteris Carruthersi*, *Equisetum*, *Otozamites*, *Podozamites*, *Trichomanites laxum* (?), and *Allthopteris*.

After the usual conversazione the meeting terminated.

THE HORN SCIENTIFIC EXPLORING EXPEDITION.—This party, which includes two members of the Field Naturalists' Club of Victoria, has been fitted out by Mr. W. A. Horn, of South Australia, for the examination of that portion of Central Australia between Oodnadatta—the present terminus of the Great Northern Railway of South Australia, about 28° S. lat.—and the Macdonnell Ranges, which lie on the Tropic of Capricorn, left Adelaide on Thursday, the 3rd May. Mr. W. A. Horn will act as leader ; Mr. C. A. Winneke, F.R.G.S., will have charge of the meteorology and surveying ; Prof. E. C. Stirling, F.R.S., of anthropology and ethnology ; Prof. R. Tate, F.G.S., of palæontology and botany ; Prof. W. B. Spencer, M.A., of biology ; and Mr. J. A. Watt, M.A., of geology ; whilst Messrs. G. A. Keartland and F. A. Belt will act as collectors and naturalists. Besides these there are three camel-drivers, a cook, and two prospectors sent by the South Australian Government. It is proposed that on arrival at Oodnadatta, about 480 miles north of Adelaide, the party will take a north-westerly course along the overland telegraph line to about Charlotte Waters, when they will strike to the west to Ayers Range, then again north-west along the Palmer to the George Gill Range, named by Giles, then up the Finke River to the Macdonnell Ranges, thence easterly to the telegraph line at about Alice Springs. This task will, it is calculated, take them about three months. All specimens, &c., obtained will be the property of Mr. Horn, who will distribute them as he thinks fit, and to whom the various reports are to be furnished on the termination of the expedition.

A TRIP TO NORTH QUEENSLAND.

By D. Le Souëf, Assistant Director Zoological and Acclimatization Society of Victoria.

(Communicated by H. P. C. Ashworth.)

(Read before Field Naturalists' Club of Victoria, 12th Feb., 1894.)

I left Melbourne for Queensland on 2nd September, 1893, in the s.s. *Arawatta*, to endeavour to procure some Tree-climbing Kangaroos, *Dendrolagus Bennettianus*, and other animals, for the Melbourne Zoological Gardens. A passenger was landed at Gabo Lighthouse, and we were thus enabled to get a glimpse of the entrance to that beautiful inlet Mallacoota, and wished for a nearer view. It is unfortunate that this place is so difficult to reach from Melbourne, otherwise it would be a great resort for holiday-makers.

On arriving at Sydney Harbour heavy rain came on, but it cleared up next day, and we left again in beautiful weather. We had a clear view of Point Hackett, South Solitaires, Cape Morton, and other landmarks along the coast, and reached Brisbane on the 8th. On going up the river signs of the late disastrous flood were everywhere visible. Our voyage was resumed again next day with fine weather. Passing Sandy Cape on the 10th, we arrived at Keppel Bay the same night at 1 o'clock, and going up the river in the tender against a strong tide, arrived at Rockhampton at 7 o'clock next morning. I left by train for Mr. Barnard's station, "Coomooboolaroo," near Duaringa, to endeavour to procure some Black-headed Snakes, *Aspidistes melanocephalus*, &c., for our Gardens, and arrived there during the afternoon. The garden was gay with bright-coloured flowers, and some of the creepers were literally a mass of blossom, almost completely hiding the green leaves. I found the doves just as numerous and tame as on my former visit, and it was a pleasure to see how fearless they had become through kind treatment. When having afternoon tea on the verandah they would frequently alight on one's hands and peck at the cake, &c., one might be holding; occasionally they essayed to alight on the rim of a cup, at the risk of upsetting the contents. At half-past 4 every day they were fed with a little grain; an old kerosene tin was rattled to give them notice, and as soon as they heard it they came flying from different parts of the garden to be fed. There were three kinds: the European Ring Dove, the Barred-shouldered Dove, *Geopelia humeralis*, and the little Peaceful Dove, *Geopelia tranquilla*, which, however, were often very pugnacious the one to the other. I visited some scrub a few miles away from the house, and was enabled to get a photograph of one of the Bottle Trees, *Sterculia rupestris*. They seldom seem to grow in the open forest country; there are two kinds here, popularly known as the Broad-leaf and

Narrow-leaf, and in times of drought they are cut down for the cattle to feed on, which they do greedily. The bark, which is very hard, is first removed; but the rest of the tree, being formed of a soft pithy substance, is all eaten. The nest and four eggs of a Collared Butcher Bird, *Cracticus torquatus*, were found near the top of a slender sapling close to the Bottle Tree. These birds were fairly numerous, their melodious note being frequently heard both in the scrub and forest land, and their nests were found on several occasions, generally near the top of small trees. In a thick bush we found the nest and egg of the Black-tailed Thickhead, *Pachycephala melanurus*, but the structure was so lightly built that the egg was in great danger of falling out. We also went to a range of rocky hills about 10 miles away, but did not find any snakes. We secured, in holes in the high lemon-scented gum trees, a clutch of two eggs of the Scaly-breasted Lorikeet, *Trichoglossus chlorolepidopus;* two eggs of the Blue Mountain Lorikeet, *Trichoglossus Novæ-Hollandiæ;* two eggs of the Yellow-crested Cockatoo, *Cacatua galerita;* and two nests with three eggs of the Friar Bird, *Philemon corniculatus*, which latter build their open nests near the ends of the branches of the acacia trees, and are consequently often difficult to get at. On our way back we found another nest of the Butcher Bird, *Cracticus torquatus*, with three eggs. In the garden a pair of Long-billed Honeyeaters, *Glyciphila occularis*, had built their pretty nest not more than two feet from the ground; it was lined with the fluff off the buds of the grape vine, a very soft substance. When their nest was taken they at once started building another at the top of a tall orange tree, to be well out of harm's way, and were sitting on two eggs at the time I left. In an old nest of a Pomatostomus, *Pomatostomus rubiculus*, a pair of Blue-faced Honeyeaters, *Entomyza cyanotis*, had made their home. They had enlarged the entrance, and for their nest used thin strips of bark, lining it with grass, and covering up the soft lining of the Pomatostomus. Their eggs were taken on 8th August, and a second clutch of eggs of the same species of bird was taken out of the same nest on 13th September; as the eggs were differently marked to the first set, they were probably laid by another pair of birds. Many birds, notably Hawks, will often use other old nests to build in or on in preference to starting new ones, and the nests of Black Ducks have often been found in deserted Crows' nests. We were enabled to visit a swamp in the neighbourhood, and when wading about in it, waist deep, came across a snake, *Dipsas fusca*, climbing up one of the dead trees. It was wonderful to see how it took advantage of every little excrescence on the bark to cling to. We were glad it did not tumble into the water, where we would have been at a disadvantage, as we could only move slowly on account of the

snags and uneven slippery ground; but it soon reached the branches and then climbed to the top of the tree. Several nests of the little Black-throated Grebe, *Podiceps Novæ-Hollandiæ*, were found floating in the water; they were made of rushes. When the bird left the nest she always carefully covered the eggs up; the eggs themselves were just below the level of the water, and consequently always wet. During the heat of the day the surface of the water is warm, and the birds often leave the eggs for a long time without sitting on them; it is possible, also, that the mass of vegetation of which the nest is composed helps to keep the heat up. The nests were generally found in the deepest parts of the swamp. A good many Black-backed Coots, *Porphyrio melanotus*, were seen; but we only found one unfinished nest, it being too early for their breeding; they break down a few rushes and bind them together to stand on. In the gum trees growing at the edge of the swamp several nests of the Little Lorikeet, *Trichoglossus pusillus*, were found, mostly with four eggs in; these birds seem to prefer building in trees growing in or near water. In a small tree near the centre of the swamp we found two nests of the White-breasted Cormorant, *Gracalus melanoleucus*, one with three fresh eggs in and the other with two; but these birds seldom breed in this neighbourhood. High up in a big gum tree a pair of Whistling Eagles, *Haliastur sphenurus*, had built their nest, in which were two fresh eggs. At nearly every swamp near here a pair of these birds had their nests; they seldom seem to build far from water. Several Pacific Herons, *Ardea pacifica*, were busy building their stick nests, but we were too early for eggs; they often build on a very thin branch, which makes it difficult to get at them. A pair of Plotus Birds, *Plotus Novæ-Hollandiæ*, were seen sailing around high overhead, having been disturbed at our approach; and an old Crow, *Corvus coronoides*, flew away from the top of a high tree in which was its nest—a very difficult one to get at, as Crows' nests here often are, they generally choosing the highest trees—but Mr. H. Barnard climbed up and found two eggs in it. Just before leaving, a nest of a White-fronted Heron, *Ardea Novæ-Hollandiæ*, was found, and in it five hard-set eggs.

On our way back we found the nest and eggs of the Fuscous Honeyeater, *Ptilotis fusca*, and the Lanceolate Honeyeater, *Plectorhyncha lanceolata*, both suspended at the end of thin branches of small eucalyptus trees. A few blacks had a camp about half a mile from the house, and one evening we heard them wailing very loudly, and found out soon after that one of their number had just died. Every evening, just after sunset, they used also to wail for a short time during the man's illness; they also do the same when any of their dogs are suffering from bad wounds, &c. The man was buried next day in the bush

about a mile away. The bottom of the grave was strewn with fresh gum leaves, and the body, wrapped up in blankets, placed in; over it a sheet of bark was put, and the grave was then filled up with freshly cut logs. A fire was kept burning alongside the grave for some time after the burial. The grave is always dug east and west, and the man's feet turned towards the east, so that, as they say, he can see the rising sun. For some time afterwards the gins used to wail for him in the evenings, beating the ground on which they sat, and their backs, with a flat shield.

We rode to a creek some miles away to see if we could find the nest of the beautiful parrakeet, *Psephotus pulcherrimus*. It makes a hole into a White Ant mound, and forms a fair-sized chamber in the centre, where it lays five white eggs. It is the only parrot we have in Australia which does this, and it is curious why it should differ from the rest of its species in so doing. We were fortunate in finding a nest, of which I took a photograph. On our way out we came across a hollow log with a track worn alongside it, showing there were dingo puppies inside. We made a fire at the larger end to prevent them escaping, and, blocking up the smaller end, cut holes with a tomahawk in the log till we came to where the dogs were, and secured two puppies, also their mother, whom we quickly dispatched. During the day we also found the nests and eggs of the Sulphur-crested Cockatoo and Blue Mountain Parrot, both close together; then the nest of the Black-backed Magpie, *Gymnorhina tibicen*, and in an adjoining tree the nest of a Collared Butcher Bird. Next we found two hawks' nests close together, and shortly afterwards the nests of a New South Wales Oriole, *Mimeta viridis*, and Friar Bird, also in adjoining trees. Birds very frequently build in company. We killed a fair-sized Iguana, or Gould's Monitor, *Varanus Gouldii*. These reptiles are very destructive to birds nesting, especially those in hollows of trees; they often feed also on bandicoot, opossum, &c., and during times of drought, when cattle are down and unable to rise, they are attacked by these creatures, which frequently eat holes in them before they are dead. When killing animals such as opossums, rats, &c., they shake them like a terrier does a rat. They can also go a long time without food. One in the Melbourne Zoological Gardens fasted for nine months before it commenced to eat, refusing all food offered to it during that time.

We saw a few Grey Kangaroos, *Macropus giganteus*, which let us approach very close on horseback. One morning three female Wallaroos, *Macropus robustus*, came close to the house and after a time went off again quietly. They had no joeys with them; the young are often killed by dingoes. There are several kinds of hornets here; the largest make their nests hanging from the lower side of granite boulders, dead boughs, &c. Another species

which generally have honey in their combs, build in hollow stumps, and the humming noise they make, which can be heard when close to, warns one not to approach nearer, as they sting badly. Another small species build a large nest on the under side of the branch of a tree, generally high up, and any birds' nests situated near them we came to the conclusion we did not want. On several occasions I noticed that the boughs of one gum tree growing close to another seemed to have been leaning against its neighbour until the bark of the other tree had grown over it, making it appear as part of the same tree.

On another occasion we rode out to some other swamps, and while passing by some cattle camps often disturbed Maned Geese, *Chlamydochen jubata*, feeding on the short green grass, also Squatter Pigeons, *Geophaps scripta*, the latter frequently running out of our way instead of flying. A flock of nine Black Cockatoos, *Calyptorhynchus funereus*, flew over our heads. They utter a different note to those found in Victoria, and breed in June and July. A few Pacific Herons were noticed building, and a nest with two eggs in of the *Falco frontatus* secured. These birds seemed to feed on dragon flies and other insects, as well as small birds, such as quail, &c. We found the nest and three eggs of the Little Friar Bird, *Philemon citreogularis*, suspended from a thin fork of a sapling, and not far off, on a tall tree, the nest of a Crow with its first egg in it; while on a thin branch of a big gum, near the water's edge, the bulky nest of a Whistling Eagle was seen with the bird sitting on it, but it was so situated as to be unobtainable, so was not disturbed. A flock of Spoonbills, *Platibis flavipes*, rose as we approached one swamp, but they do not seem to breed here, and the long-necked Plotus Bird soared high into the air, very seldom flapping its wings, but ascending by circling round and round till almost out of sight. A few freshwater shells were obtained, but only of two kinds, found on the under surface of the leaves of the Blue Water Lily. We also observed a caterpillar on the under surface of the leaves, which consequently lives under water, but found no cocoons. In some places the water was thickly covered with the leaves of the lilies, and the bright green formed a pleasing contrast to the gaunt dead gum trees standing in their midst. On a dead tree near the middle of a swamp a Blue Crane, or White-fronted Heron, *Ardea Novæ-Hollandiæ*, had its flat nest with four eggs. On our return we noticed a pair of Crested Oreoïcas, *Oreoïca cristata*. These birds have the curious habit of placing dead caterpillars on the outside rim of their nest, for what purpose I am unable to say. We passed through a thicket of flowering Melaleuca trees, *Melaleuca leneadendron*, on the banks of a creek; the scent of their flowers was very strong and by no means pleasant; hawks and crows seem to use the soft bark to line

their nests with. On the upper surface of a branch of a small tree the Podargus, *Podargus strigoides*, had its nest, but with only one egg in; the other we found lying broken on the ground underneath the nest; the structure was very shallow, and the bird could have easily rolled its egg out accidentally. It is wonderful how few eggs are knocked out of the nests by the parent birds, especially when we consider of what a flimsy character many of the pigeons' and doves' nests are; yet the birds fly on and off the nest without upsetting the eggs. We watched a Whistling Eagle settle on a tree, and immediately a pair of Collared Butcher Birds and several Minahs, which probably had nests in the vicinity, attacked it and succeeded in driving it off. After flying for some distance the eagle alighted on another tree, when a pair of Magpies went for it, giving it no peace until it had again to shift its quarters, and it probably met with the same opposition further on.

I left the station for Rockhampton without having secured the sought-after snakes, as a flood had occurred shortly before my arrival, and the reptiles had shifted their quarters, so we could not find their whereabouts. An eye-witness described to me a fight he had once witnessed between two of these snakes, each about ten feet long; they fought with great fury until killed by the onlooker. They have the local reputation of being venomous, but are really not so, and kill their prey of opossums, bandicoots, &c., by constriction, and, like many other constricting snakes, generally seem to secure their food in the evening or night, and to lie in hollow logs or crab-holes during the day. At Rockhampton the pretty Bee Birds, *Merops ornatus*, were very numerous; they had just arrived from the north, and were commencing to burrow out their nests, seeming to prefer a slight incline in sandy soil.

I left for Townsville in the s.s. *Peregrine*, arriving there on the 29th, and as the *Peregrine* did not proceed further, was detained there a short time waiting for the *Cintra* to take me on to Cooktown. While there I paid an interesting visit to Mr. B. Gulliver's pretty gardens at Acacia Vale, the popular resort of the townspeople, and noticed several nests of the Bicheno Finch, *Estrilda bichenovii*, or, as it is called there, the Double-bar Finch, each having three white eggs; these little birds build in the trees of the gardens, and seem far from shy. I also walked through the scrub to Cape Marlow, eight miles from the town, and on the way found the nest, with two brown eggs, of the pretty little Sun Bird, *Cinnyris frenata*, hanging from the dead branch of an acacia tree, about ten feet from the ground. Growing on the hot sandy soil were a few gourds—they are often used by the blacks to carry water in. I noticed also a good many Honeyeaters, but we were evidently too early for their nests, as none were found. The

handsome Swainson's Graucalus, *Graucalus Swainsonii*, was also to be seen in the mangroves near the sea, and flies and mosquitoes were very numerous in some places. On the nearly dried up swamps the beautiful White Egret, *Herodia alba*, Pelicans, *Pelecanus conspicillatus*, Whistling Eagles, *Haliastur sphenurus*, Southern Stone Plovers, *Œdicnemus grallarius*, and Silver Gulls, *Larus Novæ-Hollandiæ*, were seen, but nowhere were they plentiful.

I left by the s.s. *Cintra* for Cooktown, arriving there on 6th October, and had to wait a few days before an opportunity occurred of proceeding to the Bloomfield River. It was very windy during my stay, which made collecting difficult. On the mangroves bordering a small tidal stream three kinds of shell-fish were found, and one of the small fish that hop about up the banks and on the mangrove roots was caught; they were very plentiful and very active and seem to live more out of the water than in it. The mangrove sheds its seed in a curious way—the single seed is in the form of a narrow pod, about a foot long; when full grown it hangs down from the upper branches of the tree, the lower end being the heavier and also pointed, and when ripe falls and sticks into the soft mud below, when roots commence growing out of the lower end and a sort of cap is forced off the top end by the budding sprout; of course many fall on hard ground or in the deep water, and do not grow. The trees also often send down roots into the soil below from their higher branches, and where the trees are thick form a network difficult to get through; one rarely needs to tread on the soft muddy ground, but walks on the roots. The ground below generally has numerous small crab holes, and up here the crocodile seems to appreciate the dense shade given by these trees, and the general gloom of a mangrove swamp. In the open country Blue Mountain Parrots, *Trichoglossus Novæ-Hollandiæ*, and Friar Birds, *Philemon corniculatus*, were very numerous, feeding on the honey of the flower-laden eucalyptus trees, and very noisy the birds were, the parrots especially, as they flew screeching about from one tree to another. I also noticed the little Sun Bird breeding here. In the scrub on Mt. Cook many Lewin's Honeyeaters, *Ptilotis Lewinii*, were seen, but it was too early for their nests. A Collared Sparrowhawk, *Accipiter cirrhocephalus*, was shot with a chicken in its claws. When resting near a small pool in the scrub the Honeyeaters and Zosterops came very close, bathing in the clear water. It was very rough climbing over the broken granite rock with which the surface is covered. In company with Mr. E. A. C. Olive, I visited a small cave on the steep side of the hill, formed by huge boulders of granite, and in it caught two kinds of bats—*Nyctophilus timorensis* and *Vesperugo pumulis*, as they flew past on being disturbed. Many Mason Wasps had built their mud nests on the lower side of some of the rocks. In the wet season the blacks

often camp here. We got a nice specimen of the hanging wasp's nest, but first drove the owners off by burning the long dry grass underneath the bush it was on; several hawks, being attracted by the fire, came flying round to pick up the insects and small animals disturbed or destroyed by it. We saw some bare-looking Cotton Trees with large green pods, which when ripe dry to a dark brown colour, and open, when the cotton soon falls out. There was also a kind of native fig tree covered with very small fruit, which when ripe is of a dark purplish colour and is readily eaten by the natives and European children, but it has very little taste. The Hoya, or Wax Creeper, then in flower, was very plentiful, hanging from the scrub trees; there were two kinds—one pure white, with a delightful perfume, and the other a darker colour with no scent. The Endeavour River is thickly lined with mangroves on each side for some distance from its mouth, and is the favourite haunt of the Crocodile, *Crocodilus porosus*; crabs also are very numerous, some of a bright purple colour. The mangrove roots next the river were in many places covered with small oysters, above low water mark. A pair of White-bellied Sea Eagles, *Haliaetus leucogaster*, were seen sailing over the river, when one suddenly came down, and, catching a fair-sized fish, flew off with it to a tall dead tree. On a small tract of scrub-covered sand near the bank of the river we found the mound of a Megapode, made under a thick tangled mass of creeper, and although the mound was about three feet high, with a diameter at the base of ten feet, it was difficult to detect among the creepers. We opened it up, but found that the eggs had not yet been laid; centipedes, lizards, and snakes often make their home and lay their eggs in these nests—for the sake of the warmth, I presume. Shortly after we had opened up the Scrub Hen's nest and had camped for lunch I noticed my companion looking rather uneasy, and soon found that a fair-sized lizard had run up his leg; he gave a sigh of relief when he found out what it really was.

Near the town a good deal of mangrove has been cut down for firewood, and, as it burns freely and well, is much used. The tide runs very strongly in and out of the river, and is very hard to pull a boat against. Near the foot of Mt. Cook I noticed several large earthenware jars full of human bones, generally placed at the base of large granite rocks, and found out that after a Chinaman had been buried some time his bones were dug up, placed in a jar, and exposed to the weather for about a year, before they were shipped to China.

I started for Bloomfield in a small cutter, the distance by sea being about thirty miles. On the way down we passed close to the Hope Islands and saw on them thousands of Torres Straits Pigeons, *Carpophaga luctuosa;* also numerous sea birds on the beach, but as the latter had not commenced laying we did not

land. On going up the Bloomfield River I saw a White-breasted Sea Eagle, *Haliastur leucosternus*, plunge into the water, and, catching a fish in its talons, fly off with it; these birds are fairly numerous about here. On landing at the jetty I walked five miles along a very dusty road to my destination, "Wyalla." The house was pleasantly situated on rising ground, facing towards the sea, about five miles distant, with low-lying open forest land intervening. At the back and on one side were high mountain ranges covered with dense scrub which in some places came to within a few hundred yards of the homestead, and it was on the higher points of these ranges that the Turrabina, or Tree-climbing Kangaroo, lived. The scrub was very dry, and the ground covered with dead leaves, which made it difficult to walk without making a noise and so disturbing the animal and bird life near. As no rain worth speaking of had fallen for some months previous to my visit, the various watercourses on the flat land were for the most part dry, but on following them up the mountain for a short distance into the scrub running water was generally met with. A good breeze used to blow during the day, but the nights and early mornings were, as a rule, very calm, and consequently most of my photographs were taken shortly after sunrise, before the breeze sprang up. The varieties of timber found in the scrub are considerable, including the fine Cedar Tree, *Cedrela*, and many other kinds grow to a large size, notably the Bean Tree. Some are hard wood and others soft; several kinds exude a milk-white sap on having their bark cut into, especially one tree with very soft wood, locally known as the Flycatcher Tree, from the fact of its bearing seeds covered with a sticky substance, which are often thickly strewn on the ground under the tree, and any insects that come in contact with them are generally held. Many of the trees are valuable for their timber besides the Cedar, and a sawmill is worked at Bloomfield, the timber being either drawn in by bullock teams or floated down the Bloomfield River. The Stinging Nettle Tree, *Laportea moroides*, flourishes, especially near the edges of scrub that has been partly killed by fire or cleared, and grows to a height of about 15 feet, though generally much shorter, with a large, broad leaf. The stem is just as bad as the leaves for stinging. If one got stung on the hand or arm, the pain soon ascended to the armpit and caused a painful swelling, which often lasted for some days, and if the hands were bathed in cold water the pain became much more acute; in the same way, if the feet were stung the pain ascended. The effects of being badly stung often lasts for months; horses suffer severely when stung, but not cattle, showing how powerful the irritant poison must be. I incautiously came in contact with the plant on several occasions, but the painful experience soon made me more careful.

Creepers, also, are very numerous. The well-known Lawyer Palm, *Calamus australis*, grows everywhere, its graceful light green fronds often forming a pleasant contrast with the darker hued vegetation of the scrub; but, although pretty to look at, it was nearly impossible to force a passage through a thicket without cutting one's way. The strong tendrils are all lined with sharp hooks, curved backwards, which tear and cut badly if you force your way through them. They are the greatest hindrance to travelling through scrub, making it generally impossible to ride, as the plant is very tough and difficult to cut through. There are many other creepers, several of which are also plentifully covered with spines, but none of them are half so numerous as the Lawyer cane. I brought a few different samples with me, which will show better than description what they are like. Some had grown to a large size and length, and hung in festoons from the trees everywhere in the scrub. The well-known Queensland Bean, *Entada scandens*, is the seed of a creeper, and the long pods are often seen hanging down. The plant grows to the top of the highest trees. Cockatoos often eat the beans. The large parasitical fig trees are plentiful in the scrub, and were seen in all stages of growth, from the seedling sending down its thin roots from the fork of another tree, in which it had formed a lodgment, to the stately tree. As the seedling grows, its roots gradually increase in size and number, and after a time form a complete network round its doomed foster parent, which it slowly but surely kills, and as the wood gets rotten, the roots of the fig tree grow into it, and very soon it is completely destroyed, as will be seen in the picture. Its trunk is completely formed of roots, which give it a very curious appearance. Occasionally it sends down rootlets from its branches, which, taking root in the ground, form as it were another tree, although joined to the old one. We saw also another species of fig tree, which had its fruit growing in clusters from the trunk only. The beautiful Fan Palm, *Livistona Muelleri*, likewise grows here; in some places the trees are very thick, and when rain falls or wind blows through them, the effect produced on their large leaves can be heard for some distance. The scrub where they grow thickly is generally clear of undergrowth or creepers, and the ground covered with their large dead leaves. Several other species of palms are to be seen—namely, the Citrus Palm, *Citriobalus multiflorus*, the nuts of which are eaten by the natives, and the Pandanus Palm, which usually grows in the low-lying forest country—but none approach the Fan Palm in beauty. Occasionally the Tree Fern, *Alsophila Cooperi*, is to be found, especially on the high land of the mountain range. I saw also one fine specimen of the *Alsophila australis*, but this kind is nowhere numerous. The number of fruit-bearing trees in the scrub is very large, many of them being edible; they vary

very much in colour and size, perhaps the brightest coloured being the Quandong, *Santalum*, sp., which is purple. The trees are a fair size, with a very dark leaf, and grow principally by streams; during November the ground beneath them is often covered with fallen fruit. Orchids are plentiful, especially the *Dendrobium undulatum*, being found principally near the top of the ranges, and grow either on the granite rocks or trunks of trees, in conjunction with Stag-horn Ferns, Bird's-nest Ferns, and pretty closely-climbing creepers. All through the scrubs creepers of various kinds are found, from the delicate little plant to the large ones which hang in festoons from the tops of the highest trees, and, being so large, often look like trees themselves. The photograph gives a fair idea of them. Wallabies are numerous in the scrub, and can often be heard hopping away, but the noise made walking over the dry leaves generally frightens them before they come in sight. The natives occasionally try to spear them by forming drives, burning the patches of long grass near the edge of the scrub where they are sometimes found, and throwing their spears at them as they try to escape into the scrub; but they are not always successful in their hunts. The Tree-climbing Kangaroo, *Dendrolagus Bennettianus*, as before stated, is generally found on or near the top of these ranges, where the timber is not so high or difficult to climb. They remain during the day on the highest branches of a tree, and descend at night to pass from one tree to another. They seem to feed on Bird's-nest Ferns, leaves of certain trees, creepers, and probably on wild fruits. On one occasion one jumped from the top of the tree it was on to a rock below, a distance of about 40 feet, remained there perfectly still for a few seconds, then bounded away down the hill. I had disturbed it by climbing up the same tree, but did not notice it until about three feet away, when it jumped off. They seem never to miss their footing, and it is wonderful how they can judge distance when jumping. When hunting for them dogs are used, which track them by scent to the trees they are on, but if rain falls during the night it is more difficult. When one is found a native goes up, and either manages to catch it by the tail, or makes it jump to the ground, where other natives are on the lookout for it, and it seldom succeeds in escaping. It is then placed in a bag and carried off. The dogs often manage to bite them before their owners can prevent it, and half of those so caught generally die during the first few days of captivity from injuries received. When on the ground their tails are curved upwards, and do not as a rule rest on the ground as with ordinary kangaroos. The Bandicoot, *Bettongia*, is occasionally to be found, either in hollow logs or in domed nests built of grass in a slight hollow on the ground, and the natives often catch them and use them for food. Native rats of several

kinds were, of course, everywhere, both in the open forest land and in the scrub, and were just as bad in the house as the European rat is; nothing could be left about that they could possibly eat. If they found an egg they would quickly make a hole in it and devour the contents. We had two of different species in confinement, but getting together the larger, *Hapalotis hirsutus*, soon, unfortunately, killed the smaller, *Hapalotis hemileucura*. The rats often climb up the grenadilla vines and devour the fruit when ripe or nearly so; very little seems to come amiss to them. The larger of the two above referred to I brought on alive to Melbourne. In the scrub one often found the hard native almond gnawed through by these animals to get at the kernel inside. I heard the melancholy howl of the Dingo, *Canis dingo*, on one occasion only, and the night following it took a turkey from close to the house and devoured it. Flying Foxes, *Pteropus funereus*, are numerous all over this country, and were frequently heard squealing at night when feeding on the eucalyptus blossom; they appear to chew the flower up to get at the honey inside. I saw a few camped on a high tree in the scrub, hanging on by the claws of their hind feet. They often seemed busily engaged in cleaning or scratching themselves, and occasionally flew from one branch to another, but I saw no large rookery, such as I had seen in the mangroves on the banks of the Fitzroy River, not far from its delta, where many thousands of Pteropus camped, flying off as evening approached to their various feeding grounds, and passing high overhead in countless numbers. The quantity of fruit eaten and destroyed by so many must be enormous. Crocodiles, *Crocodilus porosus*, live in all the tidal rivers here, but are seldom seen. A black boy had been killed by one on the Bloomfield River shortly before my arrival. In Queensland they are always called Alligators. Not long ago 72 eggs were taken from one nest in the dry sand on a small island in the Endeavour River, not far from Cooktown. The small species, *Crocodilus Johnsonii*, is not found here. Domestic pigs, gone wild, are also numerous and very destructive to vegetable and other gardens if they get the chance. They live on roots, wild fruits, &c., &c. Pandanus Palms are often destroyed by them, and they never neglect to root up and take the eggs out of any Talegalla or Megapode's nest they come across.

I only saw three Carpet Snakes, *Morelia variegata*, during my visit. One about 11 feet long we caught, and placing it in an old sugar mat, carried it off. On the way we stopped to gather a few quandongs and left the snake in the bag on the track, but on coming back a few minutes after we found she had made a hole in the bottom of the bag and was half-way out; we soon got her back, however, and, carrying her to the house, placed her in a box. A few days afterwards she laid about 12 eggs, and carefully

coiled herself round them so as to completely cover them; they were about the size of ducks' eggs, with a white leathery covering, and all of them connected one with the other. She and her eggs were brought on to Melbourne. One of the other two snakes was found by a black boy and killed, but although the blacks are very fond of its flesh, they would not eat this one, as the boy who found it had not reached manhood, nor been admitted into the full rights of the tribe. The third snake was found in the scrub and took refuge under the dead leaf of a Fan Palm, but as we were a long way from the house and had nothing to put it in, we left it alone. They are said to come about more after heavy showers of rain and during dry weather to lay up in hollow logs, &c. On one occasion only I saw a Black Snake, *Pseudechys porphyriacus*, in the scrub. It is much feared by the blacks, being very venomous. It was close to us when first noticed, but did not move until disturbed with a stick, when it quickly glided away. I saw several snakes; *Tropidonotus picturatus*, in the waters when going up the creeks through the scrub; they are from two to three feet long. The Brown Tree Snakes, *Dipsas fusca*, were also often disturbed near water, and it was wonderful how they climbed the trees with apparently little support. On one occasion I had shot a Green Pigeon, *Chalcophaps chrysochlora*, which fell by a Lawyer Palm, and on picking up the bird I noticed the palm leaf I was almost touching was moving, and, looking closely at it, saw a brown snake, about five feet long, rapidly making its way along it to an adjacent tree, up which it soon climbed, taking refuge in the thick foliage near the top. They are non-venomous, and evidently live principally on small birds. They may often be mistaken for a stick, as they are of a dull brown colour, and appear to remain motionless when watching for their prey. On one occasion when on the beach at Cedar Bay, opposite the camp of Messrs. Meek and Barnard, I found a live specimen of the Eel-like Snake, *Dupysurus anguilliformis*, which had been washed up on the sand. It was about three feet long, and being out of its natural element found a difficulty in travelling over the ground, but when put back in the sea it swam away with its head out of the water. This district is very rich in bird life, and all day long, and at night also, their varied notes may be heard, both in the forest country and especially in the scrubs. The Scrub Turkey, *Talegallus Lathami*, is plentiful on the ranges, but seldom comes to the low-lying country. Its mounds were frequently found; they are composed almost entirely of leaves, which they scratch off the higher ground on the upper side of the nest, often going as far as 50 feet away. They lay large white eggs, with very granulated thin shells, apparently to the number of 16. These are generally laid to the depth of 18 inches, but they are said to lay their eggs deeper in wet weather than in dry. The size of the mounds

varies considerably, and they seem to keep on adding to them during the whole breeding season. Like other mound-building birds, the young are quite able to take care of themselves as soon as hatched. Those taken by the blacks from the eggs just before hatching are sometimes brought in and reared. The Scrub Hen, *Megapodius tumulus*, is only found in the low-lying country, and makes very much larger mounds than the Talegalla. The same mound is used year after year, and is composed of earth, sticks, leaves, &c. The eggs are laid from 18 inches to 3 feet deep, and are of a pink colour, very similar in appearance and size to the Mallee Hen, *Leipoa ocellata*. I saw many nests, the largest being 10 feet high by 25 feet in diameter at the base; it contained an immense amount of material, having evidently been used for many years. We secured a good many eggs at different times. The temperature of the mound where the eggs were placed was 95°. These mounds, like those of the Talegalla, are often resorted to by reptiles and insects to lay their eggs in. These birds have great strength to enable them to scratch the material up of which their nest is composed. The blacks say the young birds find their way out of the nest, but I certainly should judge that they were liberated by the parent bird, as is the case with the Mallee Hen. The fact of the young birds being often taken out of the egg would help to support this view, as otherwise they would be found making their way out of the mound, through the dirt, which I could never hear of their ever having been found doing. The same statement was made about the Mallee Hen, but it has been proved that the young cannot make their way out of the mound, and, if not liberated, die in the egg. The young birds generally stay with the old ones for a short time, and when all are hatched leave the vicinity of the nest; these birds are often found on the islands along the northern coast, and we found them breeding on the North Barnard Islands in 1891. Like other birds of the same kind they generally roost on the top branches of the trees, flying from one branch to another till they get to the desired height. Occasionally the beautiful White-bellied Sea Eagle, *Haliaetus leucogaster*, was seen soaring high overhead, but they were not numerous. I heard of the locality of two of their nests on very high dead trees, but it was too late to visit them, as they generally lay in August. The White-breasted Sea Eagles, *Haliaetus leucosternus*, were much more numerous, but they likewise breed early in the season, laying three eggs. On one occasion on the Bloomfield River, I saw one plunge down from a considerable height and carry off a fish in its talons to a neighbouring dead tree. It is a curious fact that one of their nests is almost invariably found in the branches of the large trees in which the Shining Calornis, *Calornis metallica*, build their numerous clusters of nests. On one occasion I saw a specimen of the White Goshawk,

Astur Nova-Hollandiæ, and it looked very pretty against the dark background of a scrub-covered mountain. I was fortunate in securing a clutch of two eggs of the Australian Goshawk, *Astur approximans*, not very far from the house. It had built up an old nest of last year. A pair of Goshawks, *Astur cruentus*, were often seen in the neighbourhood, but we could not discover their nest. I only secured two specimens of owls in the scrubs—one the large, dark-coloured Rufous Owl, *Athene rufa*, which was roosting during the day in some very thick scrub, but flew to a short distance away on our passing underneath, and so made its presence known. A Sooty Owl, *Strix tenebricosus*, was found in a similar way, and when shot we noticed it had lost every feather of its tail, and was altogether in a ragged condition. Half an egg shell was given me, which the blacks said belonged to the Powerful Owl, *Athene strenua*, and had been thrown out of the nest when the young birds hatched, but I did not see the bird myself. On the coast, about six miles from the house, very few sea birds were to be seen, they had apparently all gone to the outlying islands to breed on the mud flats. Pelicans, *Pelecanus conspicillatus*, Curlews, *Numenius Australis*, and a few waders were seen. The Pelicans are said to breed on the Hope Islands, and on a sand-bank not far from there I saw hundreds of Crested Terns, *Sterna media*, nesting, but was unable to land. In the scrubs pigeons were very numerous, especially the Torres Straits Pigeons, *Carpophaga luctuosa*, which were often seen in large flocks flying to roost on the islands in the evening and returning in the morning. On the Hope Islands many hundreds were busy hatching and rearing their young, but few seemed to lay on the mainland. We only found one nest, high up in a large tree, with one fresh egg in. Out of the many hundreds I have seen I have never found more than one egg in any nest. The Allied Fruit Pigeon, *Carpophaga assimilis*, was often heard uttering its curious guttural double note in the leafy tops of the high trees, but though often heard it was seldom seen; we found several of their nests, each of which had one egg in. The frail structures were often built on thin boughs overhanging the streams, and the birds were easily disturbed by anyone passing near the tree containing their nests, which otherwise would probably not have been noticed. Near the creeks, both in the open and scrub lands, but more often in the latter, we saw the Long-billed Green Ground Pigeon, *Chalcophaps longirostris*, and found its nest, and one egg, on a small tree on the banks of a stream. When camped on the banks of the Annan River, in the ranges, we were fortunate in finding the beautiful Superb Fruit Pigeon *Ptilinopus superbus*, and secured a specimen as it sat on its nest, getting the egg uninjured. Two more nests were found on the top of a range in the vicinity, both built within ten feet of the

ground, and also another nest with a young one in not more than two feet from the ground, in a small bush. It is a puzzling thing why the egg does not fall out of the nest, it being composed of so few sticks that when the bird is not on it is very difficult to find. Near the same river we found two nests of Ewing's Fruit Pigeon, *Ptilinopus Ewingii*. One had a young one in, and the other a fresh egg; they were built on small trees overhanging the water. We secured a specimen of the Brown Pheasant Pigeon, *Macropygia phasianella*, which is said to build on a Bird's-nest Fern and lay one egg, but we did not find a nest. The little Peaceful Dove, *Geopelia tranquilla*, was occasionally seen, in the open country only, and then generally on the ground. This bird is also found in the Wimmera District in Victoria, so has a wide range. I noticed two kinds of Friar Birds in the open country—the Silvery-crowned, *Tropidorhynchus argenticeps*, and the Helmeted Friar Bird, *Tropidorhynchus buceroides*. Both were numerous, and commenced building about the end of October. They build similar nests, generally composed of grass and the bark of trees, and hang from the fork at the end of a bough. I got the nest and three eggs of the Silvery-crowned Leatherhead or Friar Bird at Cooktown, and the nest of the Helmeted Leatherhead at Townsville. The Northern Sphecotheres, *Sphecotheres flaviventris*, were very plentiful, associating with the Leatherheads. On one small gum tree we found five of their nests, also one Silvery-crowned Leatherhead's nest. The eggs were three in number, and the small nests were built of rootlets, hanging on a fork at the thin end of a branch, and generally impossible to get at. The eggs secured were pushed out of the nest by a native on the tree by means of a long thin stick, and I caught them in my hat as they fell. None were broken by this means, although some fell from a considerable height. The male and female birds differ considerably in colour, the former having a bright yellow breast and the latter a brown mottled one. A pair of Crescent-marked Orioles, *Mimeta flavocincta*, were found nesting in a Melaleuca tree growing close to a waterhole. The nest was very similar to that of a Friar Bird, and had two eggs in on the point of hatching. Dronga Shrikes, *Chibia bracteata*, were also plentiful in the open country, and were sometimes seen in the scrub. They have a very curious note, very similar to the Swainson's Graucalus, and which is difficult to describe. No nests were seen, it being evidently too early for them, but on my way down to Melbourne I heard of one which was being built on Magnetic Island, near Townsville, and have since received the nest and eggs from Mr. T. Gulliver. In the scrub the beautiful strong note of the Quoy's Butcher Bird, *Cracticus Quoyii*, was generally to be heard, the notes of the male and female birds being often heard in concert while busily engaged looking for large grasshoppers,

caterpillars, eggs and young of other birds, &c., &c., which constitute their food. Rifle Birds, *Ptilorhis Victoriæ*, were fairly plentiful in the scrubs, especially near the coast, and they were by no means shy birds. We had great difficulty in finding their nests, but one was discovered by the blacks when clearing a place for their camp, with two beautifully marked eggs in. The nests are very loosely put together, and hence are built in some situation that holds them secure, either in a thick bunch of creepers, a Pandanus Palm or a Fan Palm, the latter seemingly being the favourite. When I left another nest was being built in a Cordyline, only about seven feet from the ground. The hen bird when sitting is not easily disturbed. Their harsh single note was often heard. They seem to be very local. I saw two of them trying to drive a Quoy's Butcher Bird away from the neighbourhood of their nest, and then they uttered a different note to their usual one. In building they seem to have a weakness for the cast skins of snakes, as in two instances I saw pieces of snake skin worked into their nest, one piece being about three feet long, most of which was hanging loose. I had heard of this habit before in the Cardwell district. I noticed two species of Graucalus, the beautiful Swainson's Graucalus, *Graucalus Swainsonii*, and the Varied Graucalus, *Graucalus mentalis*, but was only successful in finding the eggs of the Varied Graucalus, both at Duaringa, Townsville, and Bloomfield. A pair of the Swainson's Graucalus had a nest in the neighbourhood, but it contained young ones. Sulphur-crested Cockatoos, *Cacatua galerita*, were very numerous, both in the scrub and open country. King Parrots, *Aprosmictus scapulatus*, were occasionally seen; they nested in holes in gum trees that grew in the patches of open country on the higher parts of the mountains. Blue Mountain Parrots, *Trichoglossus Novæ-Hollandiæ*, were very numerous, their shrill call being heard at all times of the day, as they fed on the honey-laden blossoms, both in the scrub and open forest country. About two dozen roosted on a eucalyptus sapling about five yards from the house, and I noticed just before dark that they all roosted in pairs, one close alongside the other. In the open country we secured a nest with two eggs in. The Scaly-breasted Lorikeet, *Trichoglossus chlorolepidopus*, and a very small Parrakeet, were occasionally seen, but I was unable to obtain a specimen of the latter. On two occasions only did I see the Channel-bill Cuckoo, *Scythrops Novæ-Hollandiæ;* these birds lay their eggs in the nests of Crows, Magpies, and Sparrowhawks; but the Pheasant Coucals, *Centropus phasianus*, were numerous, and their curious deep note was often heard. One of their nests, with young in, was destroyed by a bush fire not far from the house; it was built in the long grass. They also build in the thick heads of the Pandanus Palm, laying

white eggs. This bird, as is well known, is the only Cuckoo in Australia which builds its own nest; it looks a bulky bird when lazily flying from one bush to another, but it is nearly all feathers, and is in reality not large. The monotonous call of the Brush Cuckoo, *Cuculus insperatus*, was often heard during the day, and also throughout the night, keeping company with the Long-tailed Nightjar, *Caprimulgus macrurus*, as the latter uttered its curious note, somewhat like the sound of chopping, hence its local name of the "Chop-chop" Bird. I searched a good deal for the single egg of this bird, which it lays on the bare ground, generally in the shade of a clump of small timber, but was only successful in finding young ones, it evidently being rather late for eggs. Much of the open country also had been burnt, and the fire would probably have destroyed any eggs it passed over, except where the ground was very bare. One of the most numerous birds in the scrub was the Lewin's Honeyeater, *Ptilotis Lewinii*, and when sitting quietly near any stream they would come to within a few feet of one, take a dip in the clear water, and then hurry off again. Only one nest was found, and that a few days before I left; it had two fresh eggs in. In the open country a good many Dusky Honeyeaters, *Glyciphila modesta*, were seen, and several of their dome-shaped pendent nests were found in Melaleuca saplings, generally about eight feet from the ground. A nest and two eggs of the little Obscure Honeyeater, *Myromela obscura*, was also found in the open country, placed high up in an Ironwood tree, and very difficult to detect among the bright green leaves. When in the scrub for the first time, many curious notes attract one's attention, but none perhaps is more unlike a bird's call than that of the Cat Bird, *Ailuredus maculosus*, but I cannot say that I could detect the faintest resemblance in their cry to any sound made by a cat. When the bird utters its call it straightens its body and throws its head back, giving it a very grotesque appearance. Their nests are generally built at the top of a small thin tree in the scrub, and are not often more than fifteen feet from the ground; one nest we found was only about two feet from the ground, but that was exceptionally low. They lay two cream-coloured eggs, destitute of any markings. They are not shy birds, and on one occasion I saw one speared by a native in some thick scrub. Honeyeaters and other small birds often try to drive them away from the neighbourhood of their nests, so they evidently are not above robbing their neighbours occasionally of eggs and young. The bright-coloured Dragoon Bird, or Pitta, *Pitta strepitans*, is another bird which has a curious cry, and several pairs of them were noted in the scrub. The nest and eggs of this bird were taken shortly after I left, being built on the ground alongside the butt of a tree. Another numerous scrub bird is the Rusty-

breasted Shrike Thrush, *Colluricincla rufigaster*, its beautiful clear note being often heard, and several nests were found, generally within a few feet of the ground. The photograph shown was taken of a nest *in situ*. They are not easy to come across, and are generally first noticed by seeing the bird fly off. These birds do not seem to live near the tops of the higher mountains, but are there replaced by what I took to be the Brown Shrike Thrush, *Colluricincla brunnea*, a bird which has a stronger and even more melodious note. They are destructive to the eggs and young of other birds, and the natives say they destroy their own eggs if disturbed. On one occasion on our way to Romeo we passed by a nest close to the track; the bird flew off, and we noticed two eggs in the nest, but did not touch them. On our return shortly afterwards we found one of the eggs broken, which may have been done by the parent. In the open country the Laughing Jackass, *Dacelo gigas*, was often seen and heard, and made its nest by burrowing a hole in the White Ants' nests high up on the trees. Leach's Kingfisher, *Dacelo Leachii*, was less numerous; it makes its nest in the hollow of branches. Macleay's Kingfishers, *Halcyon Macleayi*, were plentiful, laying also in a burrow in the White Ants' nests, while along the creeks were seen the Red-backed Kingfisher, *Halcyon pyrrhopygius*, busily engaged in making excavations at the time I left. The beautiful Little Kingfisher, *Alcyone pusilla*, which also makes its nest in a burrow on the bank, is the smallest of Australian Kingfishers. In the scrub was often heard the note of the White-tailed Kingfisher, *Tanysiptera sylvia*. They generally arrive here in October from New Guinea to breed, and for their nests burrow holes in the small mounds on the ground made by White Ants. These mounds are never large, rarely being over two feet and a half high, and I was told are only found on the coast ranges, and that these Kingfishers never make their nest anywhere else than in them. As soon as the birds have made their burrows the White Ants carefully fill up all the entrances from their mound into the bird's excavation, and consequently never interfere with the bird in any way. When the birds have left with their young the insects evidently fill up the hole again, as old burrows are rarely ever found. The Shining Calornis, *Calornis metallica*, were plentiful, and build their nests in great numbers on one tree, generally choosing one of the largest trees in the scrub, and one that has no other tall trees growing very close to it. Their nests were in clusters, and they were hard at work constructing them during my visit. Many get blown down on to the ground, and their eggs occasionally get upset, and are found broken underneath. These birds are very noisy, and it is easy to tell when one is in the neighbourhood of their nests. They go about in flocks, even when gathering material off the palm trees for

building. They are locally called Starlings, and have very much the appearance of those birds when flying. The trees are, as a rule, very difficult to climb. The ground under them is generally covered with the dead seeds of various fruits, and also infested with the very small red Scrub Ticks, which come up one's legs in hundreds, and soon make their presence felt by burrowing into the skin and raising an irritating lump, yet they are so small that they are often difficult to detect. When I was taking photographs under a large tree, my black companions carefully watched me from a distance, not wishing to suffer the inconvenience I afterwards did from these insects. On several occasions, in the open country, we flushed the Least Swamp Quail, *Excalfatoria australis*, generally in pairs, and in the scrub the Chestnut-backed Quail, *Turnix castanotus*, but very few of the latter were seen. The curious nests of the Great-billed Gerygone, or Flood Bird, *Gerygone magnirostris*, were noticed hanging from slender creepers over the streams, they were sometimes high up, and at other times only a few feet above the water. They get their name from the nests having the appearance of a long bunch of rubbish left by a receding flood; these are about two feet long, with the nest at the lower end—a wonderful structure for such a tiny bird to build. The Yellow-throated Sericornis, *Sericornis citreogularis*, builds its large hanging nest in the thickest part of the scrub, and we found several. One was composed chiefly of moss and skeleton leaves it had picked up out of a dry waterhole; the combination was very pretty. The Large-billed Sericornis, *S. magnirostris*, was also seen in the scrub, and its nest and eggs on two occasions found. We found also several nests of a Gerygone in the scrub, but curiously enough they were always built within a foot or so of a hornet's nest, and we had to drive the hornets away with smoke before venturing to touch the nest. The birds must have some reason for building so close to them, and it would be interesting to find out what that reason is. The Large-headed Robins, *Eopsaltria capito*, were noticed and the nest and eggs found. This species was found in the scrub at the foot of the ranges, but another variety, *Eopsaltria nana* was found higher up towards the tops of the mountains; both build somewhat similar nests, and generally on a Lawyer Palm, not far from the ground; the structure is very pretty and compact, generally having moss on the outside. The Pied Grallinas, *Grallina picata*, were seen occasionally in the open country, but nowhere were they numerous. Several kinds of Flycatchers were noticed in the scrub and open country. A Frilled-necked Flycatcher, *Arses*, sp., was seen in the scrub on several occasions, its black and white plumage being quickly noticed; a specimen was secured, and it has since proved new to

science. The Black-fronted Flycatcher, *Monarcha trivirgata*, was fairly plentiful, with its more sombre colouring of dark grey and black, and several of their pretty cup-shaped nests were found, generally built on the topmost branches of a small shrub, about four feet from the ground. They fasten empty spider-cocoons on the outside of the nest, the white looking very pretty against the green moss of which the outside of the nests is often composed; we always found their nests near a watercourse. The nest of the Yellow-tinted Flycatcher, *Micræca flavigaster*, was found in the open country by Mr. Frank Hislop, but it was so small and so similar in colour to the branch on which it was built, that it was very difficult to detect; it was only noticed by seeing the bird flying off it. It had one egg in, partially incubated. This egg is new to science, which is not to be wondered at, seeing how hard the small nest is to see; it is probably one of the smallest of Australian birds' nests. There was only room for one egg in the nest. The Shining Flycatcher, *Piezorhynchus nitidus*, was seen occasionally, and its nest and eggs procured at Ingham by Mr. P. Cochrane, who kindly sent them to me. Several other varieties of Flycatchers were observed in the open country, and their nests were more often found on a dead branch of a tree than on a green one. Near the top of the ranges we secured a Spalding's Orthonyx, *Orthonyx Spaldingii*, and were fortunate in finding its nest and one white egg. The nest had the appearance at first of a Lyre Bird's, being built on the ground, but the structure was composed outwardly of leaves, with a thick lining of moss, and situated at the foot of a small tree. The photograph taken gives a good idea of its position. In the thick scrub, well up the mountains, we on two or three occasions heard the call of the Coach-whip Bird, *Psophodes crepitans*, but the note uttered is slightly different from our Victorian one; one nest was secured with two fresh eggs in. Several White-vented Wood Swallows, *Artamus albiventris*, were seen, and one pair had their nest in a slight hollow of a dead bough well up in a gum tree, and four eggs were laid. Four birds were often seen about the nest, but I presume it only belonged to two of them. Once when high up on a spur of Mount Finlayson we came across the playing place of the Tooth-billed Bower Bird, *Scenopœus dentirostris;* it was a clear space on the ground in the scrub, and plentifully adorned with coloured leaves, land shells, &c. I was unable to take a photograph of it. There were no sticks stuck in the ground as with the other species. We saw two of the birds. The Red-backed Superb Warblers, *Malurus cruentatus*, were very plentiful, and were often seen in small flocks of five or six, generally keeping in the high grass, and on one occasion I saw a few Blue and Black Superb Warblers, *Malurus cyanochlamys*, in the edge of a thick patch

of scrub bordering the road. Several nests of the beautiful little Sun Birds, *Cinmyris grenata*, were found ; one was built within two feet of my bedroom door, and the young reared during my visit. In the open country several Lace Lizards, *Varanus Gouldii*, were secured. They live in burrows in the sandy soil, generally with two or three entrances ; on one occasion we saw one kill a small snake about a foot long, which it would doubtless have eaten if it had not been disturbed. I have often known of snakes feeding on small lizards, but did not before know that these large lizards turned the tables on small snakes. In the country near Duaringa these reptiles were generally found in the neighbourhood of lagoons. Water lizards were found occasionally about the small streams near the coast, and prettily marked lizards, *Varanus punctatus*, about nine inches long, were often disturbed, when—as with this class of reptiles—they at once took refuge up a tree, carefully keeping out of view as they rapidly ascended the trunk. One small lizard, popularly called the Bilbil, was heard in the scrubs, especially after rain, uttering a loud call for such a little thing ; in some places they seemed very numerous. A pretty little red lizard, *Liolepisma fuscum*, was nearly always to be seen, especially in the scrubs ; they were very fearless, and if one sat quiet and made a slight rustling among the leaves, they would come up to see what caused the rustling. They are very fond of eating grasshoppers, and on several occasions I saw them capture and devour their prey, shaking the insects when first caught. Gecko Lizards were sometimes seen, but were not numerous. In the creeks the blacks used occasionally to spear eels and other fish, and when bathing in the creeks in the scrub and sitting still for a short time small fish often came round and amused themselves by nibbling one. In the saltwater inlets large fish were often seen. The natives use a four-pronged spear to capture them with. Beetles were not numerous at this time of the year, and those we found were mostly in rotten wood, the large black *Cassalus teres* being very common, as was the large longicorn beetle, *Xixuthrus nycticorax*. The latter insect was invariably got out of the surface roots of a palm tree, and the beautiful spotted longicorn out of holes in the trunk of the Pandanus Palm. We noticed the butterflies were often much more plentiful in some places than others ; those seen in the scrub were hard to capture. The beautiful green butterfly, *Ornithoptera Richmondiana*, was seen, but it always flew high and well out of reach. The blue *Papilio Ulysses* was fairly numerous in places, and the beautiful colours of many of the Lepidoptera fliittng about added much interest to the scrub scenes. Many of the moths were very large. One specimen of the Atlas Moth was shot with dust shot, as it flew high up among the tree-tops, being chased by numbers of small birds. Another moth

here destroys most of the oranges by making holes in them and devouring their contents. It often does the same to the grenadillas. Large dark brown coloured moths were occasionally disturbed in the scrub, but they could hardly be detected unless they flew; the markings of many were very beautiful. We saw very few scorpions, and those were not large. Land shells were plentiful in places. The natives use the larger ones as an article of food, and those found in the scrub are different to those found in the open country. I was fortunate in getting a beautiful new species, which has been described by Mr. Hedley, of the Australian Museum, Sydney, and named *Papuina cerea.* I only succeeded in getting the one specimen, and that I found in the scrub. Of the freshwater shells found one was new to Australia, *Neritina variegata.* Small crayfish were to be found in all the freshwater creeks, the *Telphusa brassa* and *Scopimera globosa* being the most numerous. Frogs were found in all sorts of places, dry and wet; in the dry, hot, open country we often came across specimens of the *Hyla Peronii.* One large frog had its habitation in a long hollow palm, used as a portion of the fence near the house, and its croak was often heard, especially during showery weather. Other varieties were found in rocky creeks in the scrub. Several kinds of Cicadæ were heard, both large and small, but I was unable to secure specimens. I noticed in one part of the scrub that one species of these insects seemed all to utter their shrill sound at the same time, and then pause and again utter it, the many hundreds of them seeming to act in concert. Both the curious stick insects and leaf insects were occasionally noticed, but more often escaped detection from their similarity to their surroundings.

Spiders were very numerous. A large variety frequently made its web right across the openings in the scrub over the creeks, often ten feet or more in breadth, and on one occasion I saw a large leaf, which was falling to the ground, get entangled in one of the webs. It took the spider a quarter of an hour to disentangle it. I noticed a small cobweb which had a perfect cross just above the centre of the web—it was made of cobwebs, thickly woven together. White Ants (Termites) were very numerous; and two different kinds of mounds were plentiful in this neighbourhood. One was of a large, bulky structure, often reaching the height of eight feet, and found in the open country only, and the other was a small one, of a conical shape, always built in the scrub on the coast ranges, and not exceeding two and a half feet in height. It is in this structure that the White-tailed Kingfisher builds its nest. In the larger kinds of mounds, first mentioned, rats, lizards, &c., &c., often made their homes. Some distance away from here, in the open country, the curious mounds of the Termites called the Meridian White

Ants are found, but I was unable to visit them. They are said to build long, narrow structures, always running from east to west, and never to vary from that direction. A small kind of hornet is often found in the scrubs, and is very troublesome. It builds its pretty combs in varying situations, but not far from the ground, frequently hanging on the lower side of some large leaf, and difficult to detect. The first intimation one often has of their presence is by their quickly alighting on one's shoulders and arms and stinging sharply, which generally has the effect of at once driving their enemy away. When securing birds' nests in their immediate proximity we used first to drive them off with smoke. Ants were everywhere, and in great variety, especially the Green Ant, a very pugnacious species, which builds its nest of leaves in the trees. Fortunately, they are not very venomous, but for all that they bite very hard and will not leave go; if disturbed they at once go for the intruder. Their nests are often large, and made of leaves fastened together with a white kind of substance. This ant swarms everywhere, and is a troublesome pest. The natives secure their nests and emptying all the larvæ into a dilly bag, squeeze it out into water; it makes a very acid drink. On one occasion only did I see the Bull-dog Ant, *Myrmecia pyriformis*, and the Hopper Ant, *Myrmecia*, sp., and that was on a small patch of clear country surrounded by dense scrub. We camped there one wet night, and after the blacks had built a humpy of Lawyer Palm leaves to keep out the rain, we discovered two Bull-dog Ants' nests close by, so had to amuse ourselves by killing all stray ones, and making a fire on top of the nests to keep the others from coming out. Only one of my companions felt one during the night; he gave a yell and jumped up with an ant hanging on to one of his fingers. It banished sleep from our eyes for some time, as we did not know who would be the next to feel one. A nest of Hoppers was also about two feet from the humpy, but they did not trouble us. I noticed their abdomen was mostly white, instead of being black like the Victorian species. There was a kind of very small red ant, which used to get everywhere, into one's boxes, &c.; as, being so minute, they wanted very little room to get in, it made very little difference to them whether the box was shut or not. They destroyed any butterflies, moths, &c., &c., they could find, and were a source of great annoyance. A small black ant was also nearly as troublesome, getting at everything in the shape of food very quickly, and infesting the honey-laden flowers. A splendid collection of Formicidæ could be made here. There are said to be eight kinds of native bees in this district; they are all small and sting very slightly, though some more severely than others, and the different kinds vary in size and colour. They build their hives in various places—some

in small hollow branches of trees, others in cavities in the trunks of the trees, others again in clay banks, &c., &c. The form of the honeycomb also varies, and the honey itself is not equal to that produced by the European bee, being more liquid and darker in colour. The European bee, *Apis mellifica*, has already spread throughout this district, and it is surprising to see how hard the blacks work in cutting down a big tree to get a hive, otherwise out of reach, as they are very fond of honey. The day before I left "Wyalla" I paid a visit to some natives encamped in the scrub not far off. They are continually shifting their quarters, never staying more than a few weeks at one place. They are a fine race of natives. When in their camps, and away from Europeans, they wear no clothing, but they are rapidly becoming semi-civilized, in consequence of so frequently coming in contact with Europeans, and are perfectly safe to be with. They do a little work now and again for the settlers or tin miners, who are scattered throughout the country. The weapons they use are much better than those made by the Victorian blacks, and most of the spears are about nine feet six inches long, barbed, and more or less coloured near the ends with red and white chalk. For binding on these barbs they use either sinews from wallaby tails or cord made from the bark of trees, and cover the binding over with a substance made from the gum of the Grass Tree. Wommeras, used for throwing the spears with, are about two feet long, and altogether different in shape from those which were formerly made by the Victorian blacks. Their shields are large, the specimen I have being three feet eight inches long by one foot four inches broad. They also use waddies and a wooden sword, the specimen of the latter shown being four feet three inches long by six inches broad. They have a rude kind of musical instrument, a straight hollow trunk of a sapling, nine feet six inches long by two and three-quarter inches in diameter at one end and two inches at the other. It is naturally hollow, and not done artificially; it is very seldom that trees suitable for the purpose are found. They blow through it as one would through a fog horn, the noise being made by the blower. It is heard a good way off, and has a musical kind of sound which at a distance is very like a flute. It is the only musical instrument I ever heard of being used by Australian natives. The one referred to I got in exchange for some articles of clothing, and it is on view here this evening with the weapons. It was when the blacks were clearing the scrub for this camp that they found the Rifle Bird's nest and two eggs.

The scrubs here are very beautiful, but it is almost impossible to describe the splendid and dense mass of vegetation. The various trees grow close together with buttress-like roots, and on most of them are numerous creepers, growing to their very

summits and forming a dense gloomy shade. The creeks and mountains are often very rough for travelling over, in consequence of the rocky nature of the country, mostly granite. In addition to the Talegella and Megapode, the Australian Cassowary also inhabits these scrubs, but when captured and placed in confinement it invariably goes blind unless shade is provided, as its eyes cannot stand the bright light of the sun for long. The overland road from Bloomfield to Cooktown is very rough, and a narrow zig-zag track has been made over the mountains. It is very steep in places and the ground covered with loose stones, boulders, &c., so much so that riders have to lead or drive their horses both up and down, it not being safe to ride them. The track is walled in on either side with dense scrub, and when over the range from the Bloomfield side passes along the banks of the Annan River for some distance. This is a beautiful stream, running over a solid granite rocky bottom with deep pools in many places, worn in the rock by the action of loose stones, most of them nearly circular ; one was only two feet in diameter and about fifteen feet deep, and almost circular, the loose stones being at the bottom. The time of my visit was the dry season, but it must look much more beautiful during the rainy season, with a larger body of water dashing down the often steep rocky inclines. The banks are lined with dense scrub on either side.

On 16th November I bid adieu to the family of my kind host, Mr. Hislop, whose sons had so ably helped me in collecting during my visit, and reluctantly left this splendid collecting ground on my return journey, bringing with me six Tree-climbing Kangaroos, *Dendrolagus Bennettianus.* Two unfortunately died a few days after leaving. On arriving at Brisbane, Mr. de Vis informed me that the Tree-climbing Kangaroos I had were not *Dendrolagus Lumholtzii*, but a new variety which he had described and named *Dendrolagus Bennettianus*, after the late Dr. Bennett.

I arrived in Melbourne on 30th November, and, with the exception of the two Tree-climbing Kangaroos before mentioned which succumbed, brought everything else safely to their destination, thanks to the kind help of Captain Lee and the officers of the s.s. *Arawatta.* The stock consisted of :—Four Dendrolagus ; one Parry's Wallaroo ; two Carpet Snakes and eggs ; three Leach's Kingfishers, kindly given by Mr. E. A. C. Olive, of Cooktown ; lizards, rats, &c., &c. ; and all are now doing well in the Melbourne Zoological Gardens, the Tree Kangaroos especially being a source of great interest.

Sixty-two limelight views from photographs taken by the author were exhibited in illustration of the paper.

The following lists of specimens collected at " Wyalla," Bloom-

field River, have been kindly furnished by the heads of departments at the Australian Museum, Sydney, except the lizards, by Mr. C. Frost, F.L.S., and the Lepidoptera, by Mr. J. Kershaw, of the National Museum, Melbourne :—

Vertebrates.

Mammalia.—Chiroptera—*Nyctophilus timorensis*, Geoff.; *Vespertugo rumulis*, Gray; *Taphozous australis*, Gould. Rodentia—*Mus* (? *lineolatus*). Marsupialia—*Sminthopsis leucopus*, Gray.—Edgar R. Waite.

Lizards.—Geckonidæ—*Œdura Lesueuri*, D. and Bibr.; *Œ. marmorata*, Gray; *Gehyra variegata*, D. and Bibr. Agamidæ—*Gonyocephalus*, sp. (young), *Diporophera bilineata*, Gray. Varanidæ—*Varanus Gouldii*, Gray; *V. punctatus*, Gray. Scincidæ—*Hinulia isolepis*, Blgr.; *Liolepisma fuscum*, Gray; *L. Beccarii*, Peters and Doria; *Ablepharus Boutonii*, Desj.; *A. Boutonii*, var. *Peronii*; and *Tropidophorus Queenslandæ*, De Vis.—C. Frost.

Batrachia.—Ecaudata—*Rana papua*, Lesson; *Hyla Peronii*, Bibr.; *H. lato-palmata*, Günther; and *Hylella*, sp. (young specimen).—J. J. Fletcher and Edgar R. Waite.

Insecta.

The following orders and genera were represented, but in many cases the specimens were damaged or immature, so that their identification is uncertain :—

Coleoptera — Figulus, Batocera, Clytanthus, Amarygmus. Orthoptera—Mantis, Anostostoma, Truxalis, Phyllopterus, Phaneroptera, Locusta. Neuroptera — Chrysopha. Hemiptera — Tectocoris, Coreus, Spudaeus, Reduvius, Dindymus, Ploiaria. Hymenoptera — Stilbum, Scolia, Sphex, Mutilla. Diptera — Rutilia, Ornithomyia.—F. A. A. Skuse.

Lepidoptera.—About 40 species were obtained, of which the following are the more important :—Rhopalocera — *Papilio Ulysses*, L.; *Hamadryas zoilus*, Fabr.; *Messaras prosope*, Fabr.; *Cynthia ada*, Butl.; *Danis sebæ*, Boisd.; *Hypochrysops eucletus*, Feld. Heterocera—*Daphnis protrudens*, Feld.; *Teara Barnardii*, Luc.; *Erebus crepuscularia*, Dru.; *Strophidia sondaicata*, Gu.; *Euschema mars*, Boisd.; *Lagoptera plumifera*; *Grammodes ammoina*, Cr.; and *Potamophora manlia*, Cr.—Jas. A. Kershaw.

Crustacea.

Scopimera globossa, de Haan.; *Telphusa crassa*, M. Edw.; *Epixanthus frontalis*, M. Edw.; *Gelasimus vocans*, Rumph; *Palaemon ornatus*, Oliver; *Chelonobia testudinaria*, L.; and *Macrophthalmus*, sp. (immature).—Thos. Whitelegge.

Mollusca.

The small collection of shells gathered by Mr. Le Souëf contained two species of great interest—a land shell new to science, and a freshwater shell not before recorded from Australia. The remainder are well known and call for no remarks.

Land Shell.—*Papuina cerea*, Hedley, n. sp. Shell thin, translucent ; contour trochoidal. Colour waxen white, becoming yellowish on the third and fourth whorls, encircled below the suture by an opaque white thread, nowhere are translucent lines or spaces visible. Sculpture.—Surface of a waxen polish ; transverse growth lines can be detected by the unaided eye, and spiral grooves, almost effaced above but plainer on the base, may be deciphered with a lens. Whorls 5½, flattened, regularly increasing, the last constituting five-eighths of the shell's height, angled at the periphery, descending considerably and abruptly at the aperture, gibbous at the point of flexure. Suture impressed ; aperture very oblique, anterior margin waved ; columella oblique, wide, extending nearly to the angle of the aperture, subtruncate below. A thin transparent shining callus extends over the imperforate axis to the insertion of the anterior margin of the lip. Height, 13½, maj. diam. 16, min. diam. 14 mm.

Habitat.—One specimen occurred to Mr. Le Souëf in a scrub on a coast range near the Bloomfield River, about two miles inland, just at the back of Cedar Bay, North Queensland. The accompanying figure, of the natural size, was drawn by the writer from the type ; it shows the shell as viewed from the front and the side.

Type in the Australian Museum.

Other Australian *Papuina* are *poiretiana*, Pfeiffer, *Macgillivrayi*, Forbes, *Bidwilli*, Pfeiffer, *fucata*, Pfeiffer, *conscendens*, Cox, and *folicola*, Hedley (= *Bidwilli*, Cox, not of Pfeiffer). From these and from the foreign members of the genus the novelty is very distinct. To say that it represents a line of differentiation midway between *Macgillivrayi* and *conscendens* would be perhaps the best guess at its systematic position. To match the blade-like extension of the columella we should have to seek till in the Solomons we found its analogue in *ambrosia* ; the puffed ridge where the last whorl commences to descend recalls *Bidwilli* ; the wave of the anterior lip, more developed in *Macgillivrayi* and *Tayloriana*, culminates in the fang of *naso* ; these features, and the gloss and hue of wax, which suggested the specific name, afford a ready recognition to the newest *Papuina*.

Freshwater Shells, from the Bloomfield River.—*Neritina variegata*, Lesson. Two adult and, except as to their eroded

apices, well-preserved examples collected by Mr. Le Souëf seem to be the first of this species ever recorded from Australia.

Beyond this continent it is reported by von Martens ("Conchylien Cabinet" (2), Band II., Abth. 10, pp. 99, 100) from the Nicobars, Java, Sumatra, the Moluccas, New Guinea, New Ireland, New Caledonia, Fiji, and Samoa; by Guppy ("Solomon Islands," p. 346) from the Solomons; and the Australian Museum possesses a specimen collected by Brazier at Aneiteum, New Hebrides.

Associated with *N. variegata* were *Melania Denisoniensis*, Brot.; *M. balonnensis*, Conrad; *Bulinus pectorosus*, Conrad; *B. pectorosus*, var. *pyramidata*, Sowerby; and *Unio depressus*, Lamarck.

SALTWATER SHELLS, from Cooktown.—*Nerita lineata*, Chemnitz, *Littorina scabra*, Linn.; *L. undulata*, Gray; *Vertagus obeliscus*, Brugière; *Nassa coronata*, Brugière; *Ricinula marginatra*, Blainville, and *Tapes variegata*, Sowerby.—C. HEDLEY.

ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Proceedings Royal Society of Victoria*," vol. vi., new series:—

"Notes on the Eocene Strata of the Bellarine Peninsula, with Brief References to Other Deposits," by T. S. Hall, M.A., and G. B. Pritchard. Discusses the geological age of the strata, and gives lists of fossils obtained, also locality map.

"The Lizards Indigenous to Victoria," by A. H. S. Lucas, M.A., and C. Frost, F.L.S. Describes 44 species belonging to 22 genera and 5 families, with plate of two species new to science—*Emoa Spenceri* and *Siaphos Maccoyi*—named by the authors.

"Further Notes on the Glacial Deposits of Bacchus Marsh," by G. Officer, B.Sc., and L. Balfour, B.A.

"Further Notes on Australian Hydroids, with Descriptions of Some New Species," by W. M. Bale, F.R.M.S. Gives notes and descriptions of 31 species, 7 being new to science.

"Notes on the Trawling Expedition off Lakes Entrance," by T. S. Hart, M.A. Gives lists of the specimens obtained.

"An Operculum from the Lilydale Limestone," by R. Etheridge, jun. Gives description and plate of this fossil.

"Additional Notes on the Lilydale Limestone," by Rev. A. W. Cresswell, M.A.

"The Largest Australian Trilobite Hitherto Discovered," by R. Etheridge, jun. Describes and figures a supposed Trilobite recently found at Delatite, Victoria.

NOTICES OF NEW BOOKS.

VICTORIAN BUTTERFLIES, AND HOW TO COLLECT THEM. Part II. By E. Anderson and F. Spry. Melbourne, 1894. Price 3s.

We are now in receipt of the second and concluding part of the above work, which fully bears out the remarks bestowed upon it in a brief review in the *Victorian Naturalist*, vol. ix., p. 186. The part under notice comprises the families Lycænidæ and Hesperidæ, and extends to 50 pages. These families are without doubt the most difficult of the Rhopalocera to deal with, and the authors are to be congratulated upon the excellent way in which they have popularly described the 47 species enumerated. Owing to revision of the synonyms, and naming one or two previously unnamed species, this, the latest list of Victorian butterflies, is somewhat different to that given in the *Victorian Naturalist*, vol. ix., p. 121. Notes of the larvæ, food-plants, and habits are given, and illustrations of nearly every species are given, in many cases with both sexes and a view of the underside and of the larva, and altogether the work will do much to clear up the uncertainties of position, &c., which have existed for so long respecting these small but exceedingly beautiful insects.

Those lepidopterists who have not already secured the first part can now obtain the complete work at the reduced price of five shillings, or in cloth for one shilling more.

We trust there will be a good demand for the work, and so to some extent recoup the authors for the necessary expense consequent on bringing out a work of this description, which we hope will find a place in the library of every town in the colony, so as to tend to foster a love for the natural history of our own country.

THE trustees of the Melbourne Exhibition Building have recently issued an excellent guide to the contents of the aquarium, museum collections, and picture galleries under their charge. The portion devoted to the aquarium, some 60 pages, is very fully illustrated with drawings of the inhabitants of the tanks, and contains descriptive notes of their habits, &c. The handbook has been compiled by Mr. Jas. E. Sherrard, the secretary to the trustees.

ANOTHER useful little handbook, relating to the botany of Victoria, is "An Illustrated Description of Thistles, &c., included within the Provisions of the Thistle Act, 1890," issued by the Department of Agriculture, Victoria. It contains descriptions of nine species of thistles, or allied plants, with a coloured plate of each species, giving botanical details. Copies of this publication can be had by farmers and others interested on application to the Department.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held in the Royal Society's Hall on Monday evening, 14th May, 1894. The president, Mr. H. T. Tisdall, F.L.S., occupied the chair, and there was an attendance of some 70 members and visitors.

LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library:—"Dried Victorian Plants," 9 vols., from Mr. H. R. Hogg; "Illustrated Descriptions of Thistles," "Report on Rust in Wheat Experiments," &c., from the Department of Agriculture, Victoria; "Victorian Butterflies," by E. Anderson and F. Spry, part ii., from the authors; *Geelong Naturalist*, iii., 3, from Gordon College Science Association; "Proceedings Linnean Society of New South Wales," vol. viii. (new series), parts 2 and 3, from the Society; "Journal of Bombay Natural History Society," viii., 3, from the Society; "Transactions of Nova Scotian Institute of Science," i., 2, from the Institute; "The North American Species of Gayophytum and Boisduvalia," by W. Trelease, from the Missouri (U.S.A.) Botanical Garden; and "Nature Notes," April, 1894, from the Selborne Society.

EXCURSION REPORT.

A report of the excursion to Coburg was received from the leader, Mr. G. Sweet. The weather being threatening, few members attended, but a most enjoyable afternoon was spent in examining the columnar basalt in the Merri Creek. The basalt occupies a depression in the Upper Silurian rocks, probably caused by their erosion previous to its deposition. A good example of a pavement of geometric design was also seen. The columns are seen to have 4, 5, 6, and 7 sides, the majority being five-sided.

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that a meeting for practical work was held on the 23rd April, when there was a fair attendance. The course in Practical Botany was continued by Mr. J. Shephard, who took as the type Marchantia for his subject.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Chambers and Master R. Grey were duly elected members of the Club.

GENERAL BUSINESS.

After the nomination of office-bearers for the year 1894–5 had been made, Messrs. D. Best and J. T. Gillespie were elected to audit the Club's accounts for the year 1893–4.

PAPER READ.

By Mr. C. Frost, entitled "Notes on the Habits and Senses of Spiders, Part 2."

The author dealt mainly with the subject of web-making, which proved both interesting and suggestive. The various kinds of webs, their methods of construction and uses were described in detail. Instances of the enormous amount of web used were given, in contradiction of the statement of the older naturalists that the supply was limited, while the author stated that the numerous webs seen floating in the air late in the autumn were produced by spiders in their efforts to take aërial flights.

The paper gave rise to some discussion, in which Messrs. Anderson, Barnard, Hall, and the president took part.

NATURAL HISTORY NOTE.

A cutting from a Sydney newspaper was contributed by Mr. C. Frost, giving an account of recent experiments on the nature of various poisons. That of a spider (Lathrodectus) was found to be the most deadly poison yet discovered. Quite a scare had been created by this publication, to which the ill-founded dread of the so-called tarantula contributed not a little.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. E. Anderson.—Moths, viz., *Thalaina clara*, *T. Selœna*, *Mnesempala privata*, and variety, and *Smyriodes aplectaria*. By Mr. A. Coles.—Pair of Swainson's Lorikeets, *Trichoglossus Novæ-Hollandiæ*, and Royal Spoonbill, *Platalea melanorhyncha*. By Mr. C. French, jun.—Eggs of *Larus Gouldii* and *Sterna Bergii*, from Gulf of Carpentaria. By Mr. J. Gabriel.—Eight species of Australian ducks' eggs. By Baron von Mueller, K.C.M.G.—A Dodonæa collected by Mr. W. E. Matthews, as very rare, near Mt. Zero, and remarkable for its very broad fruit, by which it approaches *D. platyptera* and *D. calycina*; also *Amaranthus retroflexus*, an immigrated weed, collected by H. B. Williamson near Port Fairy.

After the usual *conversazione* the meeting terminated.

In noticing the "Thistle Handbook" last month (*Victorian Naturalist*, ix., p. 32), the name of Baron von Mueller, K.C.M.G., Government Botanist, as its author, was inadvertently omitted.

NOTES ON THE SWIMMING BIRDS OF AUSTRALIA.

By Robert Hall.

(Read before Field Naturalists' Club of Victoria, 13th Nov., 1893.)

The birds of this order are variously organized. Some have their wings undeveloped, and live almost entirely on the water; others spend half their lifetime on the wing, and many more nearly the whole of it; by others much diving is indulged in, whilst many both fly and dive well.

Molluscs, insects, crustacea, and fish form the food of all, with one exception, *i.e.*, the Columbidæ, or Grebes, which diet chiefly on vegetable matter.

Throughout the order the feet are more or less fully webbed, the legs placed far back on the body, and the tarsi compressed, adapting them for swimming; bill and wings varied, plumage very thick and close, with a quantity of down next the skin, and in some families impregnated with oil; the hind toe being always small, though occasionally absent. In the Columbidæ the toes are free, being bordered only by a wide web.

The young mostly follow the parent as soon as hatched, being termed autophagous, which includes the Anatidæ, the Columbidæ, with portions of the Laridæ and of the Procellaridæ; the heterophagous—*i.e.*, the young requiring to be fed for a longer or shorter period—being the Pelecanidæ and the Spheniscidæ.

The toes of birds, by their principal variations, furnish the primary characters whereby the whole class is divided into orders, hence you will notice this order is represented with its webbed toes; other modifications of structure indicate for the most part groups. They are more numerous (particularly the marine species) in the colder seas than in the tropics. The South Island of New Zealand is well favoured in this respect, and merely as reference we could mention Great Britain as tolerably cold with one-third of her list of marked British species as swimmers. While taking a general view of the birds of this order, our attention cannot but be attracted by some remarkable contrasts which present themselves to our notice in excess of some members and scarcity of others; for instance, the Gulls are represented by 5 species in Australia, 6 species in New Zealand, 9 on the East Asiatic coast, and 20 in Europe; the Terns by 17 in Australia and 6 in New Zealand; Petrels, 33 in New Zealand, 28 here, and 7 in Europe; Penguins, 3 with us, 12 in New Zealand, in Europe unknown.

In the order there are about 90 species represented, with Anatidæ, Ducks, &c., 20 species; Laridæ—Terns, &c., 23; Procellaridæ—Petrels, &c., 28; Pelecanidæ—Cormorants, &c., 13; Phætontidæ—Tropic Birds, 2; Podicipidæ—Grebes, 3; and Spheniscidæ—Penguins, 3.

By way of comparison, our next of kin, New Zealand, registers about 85 species, with considerably less geographical range.

Looking at a bird of this order, the principal feature which will attract your attention is the length of the neck compared with the legs, this being the only order in which the neck is longer than the legs—probably formed thus to enable the bird to search for food in the depths below while it swims on the surface.

Southern Australia is endowed with about 60 species, while the Northern is represented by about 25. The numerical superiority of the former is created by the Albatross, Cormorant, and Petrel being strictly southern, or cold water, birds, while the Tern is equally dispersed.

The North is represented with one-third of the ducks, while the South has two-thirds. Though we have five species of geese, it is noticeable that New Zealand is unrepresented, yet its duck list is nearly equal to that of our own. Of the Southern birds the Petrels figure as one-third of the order.*

FAMILY: ANATIDÆ.

CYGNUS ATRATUS, Lath., Black Swan.—This bird—one of the two representatives south of the line—is confined to the southern portions of our continent, and is the largest member of this family.

CEREOPSIS NOVÆ-HOLLANDIÆ, Lath., Cape Barren Goose.—This species is now almost a stranger among the islands of Bass Strait, where it was once numerous, as well as on the coast adjacent. Although an inhabitant of the islets, it rarely takes to the water, preferring to spend the greater portion of its time among the grass, and appearing to be strictly a vegetable feeder, and in course of time the toe-webs, through disuse, may entirely disappear. The sexes are alike in colour; irides vermilion and cere lemon.

ANSERANAS MELANOLEUCA, Lath., Semi-palmated Goose, like the last, is the sole representative of its genus. As Victoria becomes populated with the human family, so does it become depopulated with this one, as a few years back this Anser was seen in apparently countless numbers, the dense flocks affording food for the original native proprietors of the colony. A noticeable internal arrangement is the "trachea," similar in function to that of other swimmers, but of greater proportions than in any other species. The tube lies on the left side of the bird, just under the skin, and in length is often 4 feet 6 inches; nature's provision being to sufficiently raise it under the wing that respiration would not be impeded when the bird rested with its breast on the ground. The habitat extends into the north, as it is even more numerous there than here, but neither in Western

* Owing to the length of the original paper I have been obliged to curtail it in order to bring it within the capacity of the *Naturalist*, by omitting some of the more familiar species.

Australia nor Tasmania. Colour of bill reddish brown, feet yellow.

BRANTA JUBATA, Lath., Maned Goose, is a bird peculiar to us, and is popularly known as Wood Duck, and was once described by Latham as an Anas. Extent of range, according to Mr. Gould, lies between 25 and 30° S. latitude, though on several occasions in ordinary seasons I have observed and secured it as low as 35°. This bird is full of interest, even to its loud barking note, so unlike that of other geese, also from an oological point of view. The sexes vary considerably in size and beauty, the male far exceeding its mate in both respects. Possibly the lady members may raise a discussion as to what constitutes true beauty, and upset this statement. However, as Pope once said,

"We reason but from what we know."

Young birds were seen in September last.

BIZIURA LOBATA, Shaw, Musk Duck.—Here we find the sense of touch as highly developed as with the other members of this family. The tongue is a notable feature, being soft, fleshy, and of unusual sensibility. Unlike other birds, the duck discriminates its food by the touch of the tongue, and not by the senses of sight and smell. Mud and water, with the aid of such a valuable tongue, are forced through the lamellæ or sieve-like structure of the bill and rejected as food.

The oil-gland in this species is a particularly strong one; in like manner to the usual gland above the cloacal aperture, it secretes an oily matter which the birds smear or preen their feathers with, to prevent percolation of water inwards.

DENDROCYGNA (LEPTOTARSIS) EYTONI, Gould, or Eyton's Tree Duck, is principally recorded to be found in Northern Australia and to 18° S. However, last year it was secured below 30°, and specimens were purchased from our local game vendors. Owing to the difference in structure, more particularly in the form of the nail on the bill, it has received at the hands of Mr. Gould a different classification to that of Mr. Swainson, who includes it in genus Dendrocygna, our other type being the Whistling Duck, *Dendrocygna arcuata.* Similar to the goose, the legs are found to be feathered, and of like comparative length.

Proceeding to the second family of the order, the

LARIDÆ, OR GULLS,

we have first LARUS PACIFICUS, Lath., Pacific Gull.

For two years the young differ so much that speculation could easily be indulged in, *by a stranger*, so as to favour distinct species; the mottled brown of the young state may frequently be seen changing to the colouring of the adult. This Larus is to be observed in pairs, frequenting Southern Australia and Tasmania, not proceeding into equatorial waters.

Another species is the LARUS (XEMA) JAMESONII, Jameson's Silver Gull. The sexes apparently are the same in colour, and may be seen in flocks over all the southern portions of Australia, and often up rivers hundreds of miles from the coast. I have seen them during three successive years in our sister colony, beyond the Murray, at Swan Hill. The flight is easy and buoyant to the fullest extent. A third species, L. GOULDII, is to be observed in Northern Australia.

Passing into a group of birds, which are recognizable by their pointed form of bill, we have first the ANOUS STOLIDUS, Linn., Noddy Tern. This sombre-coloured tern is a northern bird and an ocean rover, preferring to spend its time distant from land, except during the breeding season, when it is to be seen in vast numbers, in company with its congener, *A. fuliginosa*, inhabiting the islands strewed so conspicuously to the east of our continent. Mr. Gilbert records it as being numerous in Western Australia—in fact, great nurseries are to be found in all the equatorial waters. Eggs received by the writer from localities 4° S. and 3,000 miles from the north-eastern coast indicate the breeding seasons to be April and November, and from 25° S. to be November and December. Mr. A. J. Campbell, F.L.S., on return from a recent trip to the Houtman's Abrolhos, described the bird as breeding in hundreds on the bushes, another species in hundreds under the bushes, and a third species by hundreds in the ground under the bushes. The sanitary arrangements of such a "home, sweet home," are anything but in accordance with the phrase. Though the flight of the bird is laboured, compensation is obtained in the largely developed membrane of the foot enabling it to swim with perfect ease. The matured sexes are almost identical, and the young acquire the plumage at an early date, as there are no decidedly prominent colours inherited. *Sterna stolidus*, of Chinese waters, is presumed to be the same as the one here figured.

ANOUS TENUIROSTRIS, Temm., Lesser Noddy Tern. Like *A. stolidus*, this species is truly gregarious, having resort to the same breeding places each year, when the nests are placed in shrubs, especially mangrove, about 5 ft. from the ground, and in closely packed encampments. The nest is very loosely constructed of herbage, principally seaweed, placed in forks and horizontal boughs of arboreous vegetation. Similarly with the other members of this genus, the birds are without "days at home," being from early morn to sunset on the ocean cruising, when towards evening they will wend their homeward way, the early arrivals waiting for the stragglers before retiring. It is at sunset that one receives a surprise in witnessing the amazing clouds or flights of thousands, hovering above the rookery before finally settling to indulge in the sleep of the just. The differences in the sexes are not visibly discernible.

ANOUS LEUCOCAPILLUS, White-capped Noddy. The geographical range is universal, occupying both sides of the Pacific and Indian oceans, and, according to Sir Wm. Jardine, in the West African waters. Like the Petrels, this bird, and all the genus, have a wandering disposition, preferring to spend their time abroad, and keeping close to the islands only during breeding season. Habits and food are similar to the two previously mentioned.

THALASSEUS PELECANOIDES, King, Torres Straits Tern.—The locality is indicated by the name, and although it extends to India, does not appear to be distributed to southern waters; still its congener in the Bass Strait is relative to a *fac-simile*. The different periods of incubation tend to create a distinctness in the broad field of brotherhood. The disposition of the bird tends towards shyness, not anxious to admit friendship with such promptitude as in the case of Noddy and Sooty Terns.

THALASSEUS POLIOCERCUS, Gould, Bass Strait Tern.—Doubt exists with its connection to the previous one, as some authorities think them to be the same as *Sterna Bergii*, Lichtenstein. This Tern is the most familiar one to us in Port Phillip, especially during the winter months, when flocks of ten to fifty may be seen about the busy parts of the harbour. It is not an unusual occurrance to shoot this species in the act of swallowing a Gar Fish; it is a "play in many acts," because, the fish being as long as the bird, digestion must play its part before the whole fish can be taken into stock, then there is the gar to be taken into account; on one or two occasions I have forestalled the bird, and received the opportunity of having a fish breakfast, or, more properly speaking, what was left of it. It is remarkable that all these birds though web-footed, seldom, if ever, swim; they dive, however, with facility. Crown of head markings in summer are jet black; in winter, mottled black and white.

The third family of this order,

PROCELLARIDÆ,

is more abundant here than in any other portion of the world, which also assists towards making our list of nocturnal birds the largest in the globe. Its geographical range, from east to west, is found to be greater than that of any of the avifauna. Southern Australia is visited during different periods of the year with about forty species, possibly half of which incubate in our waters, and whose powers of flight are simply wonderful, in storm as in calm, as the root (*procella*, a storm) implies.

This family contains the largest and smallest species of oceanic birds, the former being represented with DIOMEDEA EXULANS, Linn., Wandering Albatross, which on rare occasions is to be

seen in Port Phillip Bay. Of the nine known species patrolling the colder waters of the globe, six are peculiar to the southern hemisphere. An advantage to all the members of this genus is that of being nocturnal as well as diurnal. This Diomedea is known to breed southward of Tasmania, and memoranda taken on other islands show the young birds to occupy the breeding ground throughout the whole of the first year. During February to June the old birds forsake them, when the babies have to subsist on the absorption of their own enormous fat. The parent birds return during October, when the juveniles are ousted out, a transaction they do not take very kindly to. Possibly the body outgrowing the wings causes the detention.

The first of true Petrels, PROCELLARIA GIGANTEA, Gmel. (Giant Petrel), and a type of the most extensive family of night-fliers among our Australian aves. This genus is handsomely represented by fifteen species, and this bird is the giant of the family; also recognized in Cook's "Voyages" as "Mother Carey's Goose." Of the "Chickens" we will hear when we meet our minor friends in the Thalassidroma. The range of flight is a wide one, as in the case of *P. hasitata* (Great Grey Petrel), which is found diffused far south in Atlantic and Pacific. The flight and actions differ slightly from the majority, if not all other Petrels. The apparent colour difference is not decided, but the female is the smaller.

Allowing our thoughts to fall to zero, we meet with P. GLACIALOIDES, Smith, and find that this beautiful glacial species occasionally visits our straits, and is not a rarity between Hobart and Dunedin, as you may notice from the decks of any of our red-funnel boats. In Dr. Smith's "Birds of South Africa" a full description is given; but we cannot just now note the great breadth of the wing primaries, which is greater than in most other members, though buoyancy in flight is lost thereby.

Taking your attention to the familiar and interesting Mutton Bird, PUFFINUS BREVICAUDUS, Brandt, is the same as recalling the strange ways of this bird, so well known to you either from direct visits or Club's reports on excursions to the nurseries, as you may notice in our journals. However, I cannot refrain from quoting from Flinders' "Voyages," vol. i., p. 170, as follows:—"In Bass Strait a flock was seen to be from 50 to 80 yards in depth, 300 yards in breadth, and continuing to follow as a stream for one and a half hours." The estimated quantity was 150,000,000 birds, which would—according to further figures given—require 18½ geographical miles for a compact rookery, allowing one square yard to each family. We often see large flocks, but must surely consider this a jubilee-year one. During October last the birds visited the land to clear hollows; the following month they came to lay.

PUFFINUS ASSIMILIS, Gould, Allied Petrel.—This beautiful little species is a debtor to its elegant form, rather than its colours, for the appearance of the dark sooty-black head and neck with the contrast of white under surface are the only noticeable colours on the body. The applied specific name *assimilis* was given by our great deceased ornithologist in recognition of its affinity with the British one of almost equal proportions and colour.

Our compact little friend, PUFFINURIA URINATRIX, Diving Petrel, so often to be seen near the islands off the promontory, has been classed by seven European ornithologists under seven heads. The structure of the bird causes the habits to be different from all other members of the family, excepting the four Puffins, and mainly in not possessing the great powers of flight common to the family, though its powers of diving are a compensation, appearing simply to fly under water, when it makes the pace very warm for shrimps and small fish, upon which it feeds. The mode of flight is to keep close to and almost on the water: not troubling to rise above a wave, but simply go through it, which happens so often that the flight is a short flutter kind of motion. From several specimens taken at Cliffy Island, the colours appear to vary. Petrels are the most aërial of birds, yet this species, in its general habits, its manner of swimming and flying when unwillingly it takes flight, would be mistaken by one for a Grebe; nevertheless it is a Petrel with many parts of its organization modified.

Entering upon a few details of the fourth family, that of the

PELECANIDÆ

(embracing the Greek word for "I hew with an axe"), we find diversions of structure—though all with the four toes included in the web—under five headings:—Pelican, Cormorant, Gannet, Darter, and Tropic Bird, taking for our type the Pelican, *Pelecanus conspicillatus*, Temm., and represented by one species only, and that the only pouched bird found in Australia. This species is cosmopolitan, though not in any case do the beauty and shade tints exceed in splendour that of the one peculiar to our land. For the specific name compare its conspicuous markings (?), its entire plumage being white, omitting the primaries, secondaries, scapularies, portion of upper tail-coverts, lower row of greater wing-coverts, and a portion of the edging of the shoulders, which are black. The nest is a large structure of sticks and herbage, and ranks as a castle amongst homesteads; the eggs are generally two in number, and may be found on islands in Bass Strait and undisturbed interior waters. The food supply is confined to fish, which must doubtless entail constant labour to supply according to the demand.

Of the family GRACULUS we are in possession of five species, the most generally known one being *G. carboides*, Gould, Australian Cormorant, which can at most times be observed in our Botanical Gardens and river estuary, more particularly during the present season, as this and the following one are each day busily engaged with fishing in Hobson's Bay for young 12-inch barracouta and pilchards, which made their appearance last July in great shoals, comprising millions of the fish named, one pursuing the other and the cormorant both. Although the range is wide, the bird shows a preference for southern waters, keeping well down to the south-east. Physically this family throughout is particularly strong, exercising all portions of the body in its struggle for existence. In summer the white throat markings of the male are pronounced; in winter the markings disappear.

Of the genus SULA in this family we have four representatives, the one most familiar to us being *S. serrator*, Banks, Australian Gannet, which voyages from about the central portion of the east coast, along the southern, and up to the same parallel of the western, not venturing to stay in tropical regions. During autumn they frequent our bay off St. Kilda and Williamstown. The British species, *S. bassana*, which is generally to be seen in European collections, fails to differ from this figured species, and evidently performs those offices in the North which are done by ours in the South. The Club has the prospect of an interesting account regarding this Booby on return of our Flinders Group expedition, as the breeding place will probably be seen in all its phases.

The species peculiar to equatorial parallels is *S. leucogastra*, Bodd, Brown Gannet, extending from the northern coast to 140° E., and probably the limit. From this vicinity I have received the skin, which is dark brown on the upper portion of the body, prominently separated from neck to abdomen on the under surface of the body by pure white. Bill and legs pale yellow. The limey white of the egg, which is easily removed, then shows a uniform blue, quite differently characterizing the specimen.

The breeding seasons are during November and March, when the nest is loosely constructed of dry herbage, and both sexes incubate. A well-developed provision provided by Nature that the Gannet should not injure itself when plunging into the sea from a height of 25 or 30 feet is the "pillow" at the breast.

Still continuing, we have *Tachypetes minor*, Gmelin, Small Frigate Bird. The smaller of the two known, and strictly confined to northern waters, is in its habits a "pirate of the seas," preferring to allow others to obtain their food, then by force making a transfer and claiming possession. It is also an egg robber, as a correspondent writes:—"The Gannets

will not leave nests while one is in sight." The extended form of wing tertiaries and exterior tail feathers materially aid in the rapid flight, thus able to pursue on water as the Falcon does on land. To be correct, this bird is not a swimmer, but as it bears in the toes a deeply scooped membrane, undergoing a change as the nearest relation to this eighth order, it is so placed; in structure it shows a decided tendency towards the raptores. According to specimens reviewed from Malden Island the nuptial plumage is full during March and April, and the female is devoid of highly coloured adornment as is the case with the male.

Spheniscidæ.

Of this family we have three representatives, all inhabiting the southern waters, and more strictly aquatic than any other of the order. The colder the water the birds are the more at home; hence it is that New Zealand south, with a quarter of our coast, has 11 species, while we have 3 only, though contentment is great gain. The connections of this family are not very visible. It is suggested by some relation is on one side by the goose with the Rasores; others, through the Grebe with the Coot. Further suggestions are left for our friends present. We know that disuse through thousands of generations will produce the effect as seen in the primitive wings or paddles.

Eudyptula undina, Gould, Fairy Penguin, is probably the smallest yet discovered, frequenting Tasmanian and Victorian waters.

The note of the bird is hoarse and discordant, and as many of you have had the pleasure of visiting a rookery, we will think of a comglomerate breed of dog issuing its somewhat unmelodious bark to remind us of the note.

The sense of sight is highly developed, being able to see equally well in the different media of air and water. As much cannot be said for the sense of smell, as may be taken for granted after a visit to any one of their young colonies.

The Little Penguin, *E. minor* (Forst.), more universally frequents Southern Australia and Tasmania. On King and other islands a considerable portion of the year is occupied in the effort to rear the young, that they may successfully combat wave and wind, as one may easily imagine the necessary amount of muscular energy required for days at a time in the disturbance of the elements, and even off Hobson's Bay coasts it is not an unfrequent occurrence to find the body devoid of life, through stress of weather in all probability. The fishermen's nets very often are able to account for the result, for where a small fish can flash through a mesh, not so the bird. During one morning in the bay mentioned I have taken as many as six birds from the nets.

Columbidæ.

In noticing the Columbidæ, with its disconnected webbed toes, which are an exception to the order, always distinguished in having the toes united by a membrane attached between them, we find the birds when walking have to assume an erect position owing to location of legs not allowing a balance, and as the rudimentary wings forbid a terrestrial life the time is spent in an aquatic one. The three species (all of genus Podiceps) are principally, if not strictly, confined to southern latitudes and Tasmania, and are what may be termed stationary birds, owing to the non-development of wings.

P. Novæ-Hollandiæ, Stephen, Black-throated Grebe, often called Dabchick, as previously mentioned, is a vegetable feeder, and in structure appearing not to differ from that of the Northern Hemisphere, as seen in Great Britain, the law of representation being here shown. Although particularly to be seen in inland and coastal lagoons, they often venture from river mouths into turbulent waters, where I have noticed them year after year off Williamstown. The power of diving is great, and performed in a second, as collectors know.

P. nestor, Gould, Hoary-headed Grebe, is distinct from the previous species, for during the spring season it is ornamented with the mysterious head gear. Both nest and bird are built on architecture somewhat of a new plan to us; the former, twelve of which I observed on the 17th of last month in two water-filled depressions of the ground near Corowa, N.S.W., could be briefly described as a nest of water plants floating on the surface of two feet of water and anchored to rushes; the limey-white egg clutches comprised five and four, principally the former, and to detect the same would require the lifting off of weeds from the nest, placed there by the bird upon being disturbed, as a protective move. After the breeding season the plumes on the head disappear.

Regarding the power of flight, this order exhibits extremes—in the Grebe the least of all, in the Frigate the greatest of the class.

In conclusion, we find male birds to be universally the most highly coloured of the two, and generally larger than the females, and with but a few exceptions do our species fly above the equator. The Eastern Archipelago secures most of the Laridæ and half of the Pelecanidæ. The Indian Ocean's want of islets prohibits otherwise than coasting; while the Southern Ocean, as previously mentioned, is the stronghold. New Zealand is not here taken into account, owing to its fauna being distinct from that of our own.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The fourteenth annual meeting of the Club was held in the Royal Society's Hall on Monday evening, 11th June, 1894. The president, Mr. H. T. Tisdall, F.L.S., occupied the chair, and some 60 members and visitors were present.

REPORT.

The leader (Mr. C. Frost) reported that the attendance at, and the results of, the excursion to Sassafras Gully, on Queen's Birthday, 24th May, had been much interfered with by the heavy rain of the previous day. However, an enjoyable day was spent, and in the department of cryptogamic botany good work was done, some fifty species of fungi being noted; two species, it is expected, will prove new to science on further examination. Regret was expressed at the great damage done to the wonderful natural beauty of the gully by the establishment of the adjacent village settlement.

The meeting for practical work was held on the 28th May, the course in practical botany being continued under the direction of Mr. J. Shephard. The bracken fern (Pteris) was the type studied, and some useful work was done by members making and staining their own sections.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. W. M. Hale and J. J. E. Degen were duly elected members of the Club.

JUVENILE PRIZE COMPETITION.

The distribution of the prizes to the successful competitors in the Juvenile Prize Competition for Natural History Specimens then took place.

Baron von Mueller, K.C.M.G., kindly attended to distribute the prizes, and in his opening remarks referred to his own early efforts in the paths of science at the age of fifteen. His appropriate and encouraging remarks to each prize-taker in turn were listened to with much interest.

The following is a list of the prize-takers as adjudged by Messrs. F. G. A. Barnard, C. French, F.L.S., C. Frost, F.L.S., and H. T. Tisdall, F.L.S. :—

Zoology.

Class 2—Mollusca—First prize, Charles J. Gabriel.
,, 3—Lepidoptera—First prize, Gerald F. Hill.
,, 4—Coleoptera—First prize, Jack Turnbull.
,, 5—Hymenoptera—First prize, Bernard F. Hill.
,, 6—Collection Illustrating Orders of Insects—First prize, Bernard F. Hill.
,, 7—Collection Illustrating Life-Histories of Insects—First prize, Gerald F. Hill; second prize, Bernard F. Hill.

Botany.

Class 8—Flowering Plants—First prize, Rose Elliott; second prize, Frederick Higgins.
,, 9—Ferns, Mosses, and Fungi—First prize, John Russell; second prize, Mark Elliott.

Geology.

Class 12—Rocks and Minerals—Second prize, Frederick Higgins.

A hearty vote of thanks was accorded Baron von Mueller for his kindness in distributing the prizes.

ANNUAL REPORT.

The hon. secretary (Mr. H. P. C. Ashworth) then read the fourteenth annual report, 1893–94, which was as follows :—

"To the Members of the Field Naturalists' Club of Victoria. Ladies and Gentlemen,—Your committee have much pleasure in presenting to you the fourteenth annual report of the Club's work, being for the period ending 30th April, 1894.

"In view of the unparalleled depression and continued depopulation of Melbourne, it must be a matter of congratulation that the membership of the Club has been fully sustained during the past year. Twenty-nine members, of whom five were ladies, have been added to the list; while 23 names have been removed on account of resignation and death. The total membership may now be put down at 229, including honorary and life members. The times are more clearly reflected in the subscription list, which is one less than last year; and your committee take this opportunity of impressing on those members in arrear the necessity of prompt payment, as the financial position of the Club is not entirely satisfactory, owing to the continued suspension of the Metropolitan Bank.

"Members are also reminded that the Club's position may be improved, and its sphere of action enlarged, by the introduction of new members to our ranks, and that the present is the best time for new members to join.

"Nineteen papers and reports were read during the past year, of which zoology claimed 9, botany 2, geology 2, general subjects 3, and trips and excursions 3; and the thanks of the Club are due to those who have in this practical manner contributed to the diffusion of a knowledge of natural history, which this Club seeks to promote, and also to those members who—in

discussing these papers or in natural history notes—have brought forward many new and interesting facts and observations.

"The exhibits at the monthly meetings have shown that there are many members who have not yet contributed papers, who in forming such excellent collections must have acquired the necessary material, and we hope that they will come forward during the ensuing year.

"A successful programme of field excursions was gone through during the year, but we should like to see more members participating in the undoubted benefits of field work in conjunction with those who have had considerable experience in collecting. The extended excursion of the year was to the Furneaux Group of Islands in Bass Strait, and was a great success. The party was small, mainly ornithological, and their experiences of the breeding habits of sea birds were especially interesting, and the photographic records unusually excellent.

"Our journal, the *Victorian Naturalist*, has now completed a decade of its existence; the thanks of members are due to Mr. F. G. A. Barnard for the trouble he has taken in editing it during the past year. Although a great expense to the Club, it has amply justified its existence. Your committee have reluctantly decided to alter the form of the supplement and to curtail the number of pages, in order that the journal may not become an incubus to the Club; these alterations will apply to the eleventh volume, now commencing.

"The meetings for practical work have been continued during the past year, and interest has been fully sustained throughout. They have been devoted exclusively to microscopy, and for the latter half of the year to a systematic course in practical botany.

"The juvenile prize competition for natural history specimens has been continued, but the committee must confess to a feeling of disappointment that the entries do not show any increase in numbers, although, to do justice to the competitors, the excellence of the exhibits has never been surpassed. To those who have responded to our appeal for funds for the purpose of the scheme our best thanks are due, and also to Baron von Mueller for his great kindness in again consenting to distribute the prizes; indeed, we know that his words of kind sympathy and encouragement when presenting the prizes are as great an incentive as the prizes themselves.

"Two members of the Club, Messrs. E. Anderson and F. Spry, have published an excellent handbook, entitled 'The Butterflies of Victoria.' It marks a considerable advance in our knowledge of the life-histories of our butterflies, and can be confidently recommended to all interested. Nor must we omit to note the publication by Mr. C. French, F.L.S., Entomologist to the Department of Agriculture, of the second part of his 'Handbook to the

Destructive Insects of Victoria,' and the 'List of the Lizards Indigenous to Victoria,' published in the 'Proceedings of the Royal Society,' by Messrs. C. Frost and A. H. S. Lucas, M.A. Two other members—Professor Spencer and Mr. G. A. Keartland—represent Victorian science in the exploring expedition recently sent out by Mr. W. A. Horn, of South Australia. They are now near the Macdonnell Ranges, in the interior, and are, according to latest accounts, in excellent spirits, and doing good work. Both have gained considerable experience in field collecting under the auspices of the Club.

"In December last the Rev. Walter Fielder, who had acted as hon. secretary for the previous three years, tendered his resignation, and Mr. H. P. C. Ashworth was elected to fill the vacant position, the opportunity being taken by the members to present Mr. Fielder with a valuable microscope and accessories, in recognition of his services.

"The idea of an annual conversazione had almost been abandoned, on account of the expense and want of funds, when a proposal was brought forward to make a charge for admission. This was agreed to, and a further innovation in extending the conversazione over two evenings and the intervening afternoon was also adopted. It rests greatly with members to make the scheme a success. The exhibition will be held at the end of the present week, and we are pleased to be able to report that the prospects are very encouraging.

"The financial position of the Club continues unsatisfactory. The receipts for the year amounted to £125 16s. 5d., and the expenditure to £111 9s. 6d., leaving an apparent credit balance of £83 18s. 1d. Included in this is the amount 'locked up' in the Metropolitan Bank, which has been reduced by the receipt of a dividend of £2 14s 11d. to £60 18s. 11d. Liabilities—principally for publishing the Club's journal—exist to the amount of about £65, but these are more than covered by arrears of subscriptions and the unavailable deposits. There is also a sum of £1 13s. to the credit of the Prize Competition fund.

"In conclusion, the committee would urge on all members the benefits of attending the ordinary meetings, the meetings for practical work, and the field excursions, and also helping with either papers or notes for the information of their co-workers.

"Signed, on behalf of the committee,

"HENRY THOS. TISDALL, *Chairman.*
"H. P. C. ASHWORTH, *Hon. Sec.*

"*11th June*, 1894."

The report was adopted, on the motion of Messrs. Hall and Macgillivray.

FINANCIAL STATEMENT.

The financial statement for 1893–94 was then read by the hon. treasurer (Mr. F. Wisewould), and was as follows :—

RECEIPTS.

To Balance on 30th April, 1893	£69	11	2
,, Subscriptions	113	10	6
,, *Victorian Naturalist*—Sales	12	3	1
,, Interest	0	2	10
	£195	7	7

EXPENDITURE.

By Printing *Victorian Naturalist*	£56	12	6
,, Rent of Rooms, &c.	25	14	0
,, Periodicals	4	13	0
,, Printing and Stationery	2	19	6
,, Postages and Sundries	17	18	0
,, Collector's Commission	3	12	6
,, Balance	83	18	1
	£195	7	7

PRIZE COMPETITION FUND.

RECEIPTS.

To Balance	£2	1	6
,, Donations	3	19	0
	£6	0	6

EXPENDITURE.

By Prizes, 1893	£4	7	6
,, Balance	1	13	0
	£6	0	6

F. WISEWOULD, *Hon. Treasurer.*
1st May, 1894.

Audited and found correct.

D. BEST,
J. T. GILLESPIE, } *Auditors.*

MELBOURNE, *8th June*, 1894.

The statement was received and adopted, on the motion of Messrs. Hill and Shephard.

OFFICE-BEARERS FOR 1894–95.

Before proceeding to the election of office-bearers Mr. Wisewould regretfully tendered his resignation as hon. treasurer, but added that it gave him great pleasure to be able to nominate Mr. C. Frost, F.L.S., to the position. This was seconded by Mr. C. French, F.L.S., who also spoke of the Club's indebtedness to Mr. Wisewould during the past two years.

The following office-bearers for 1894–95 were declared duly elected, being the only nominations received :—President, Mr. H. T. Tisdall, F.L S. ; vice-presidents, Mr. F. G. A. Barnard

and Professor W. B. Spencer, M.A.; hon. librarian, Mr. E. Anderson; and hon. secretary, Mr. H. P. C. Ashworth.

A ballot for five members of committee resulted in the election of Rev. W. Fielder and Messrs. T. S. Hall, M.A., G. R. Hill, J. Shephard, and G. Sweet.

A unanimous vote of thanks was accorded to the retiring office-bearers.

NATURAL HISTORY NOTES.

Mr. T. S. Hall, M.A., brought forward a note on the occurrence of a species of Salp in Port Phillip.

Mr. C. Frost, F.L.S., contributed some newspaper cuttings on the large amount of spider web found in certain parts of the country during the past month. Mr. Frost referred this to the great proportion of failures of the migratory spiders to float away, and also advanced a theory to account for the migratory instinct. From his own observations he had noticed that snare-weaving spiders can exist much longer without food than ground spiders, and the scarcity of insects on the ground during the autumn prompts the latter to seek new hunting grounds.

EXHIBITION OF SPECIMENS.

In addition to the juvenile prize competition exhibits, the following were the principal exhibits of the evening:—By Mr. A. Coles.—Pair of Brown Quail, *Synoicus australis.* By Mr. C. French, sen.—Collection of Australian Hawk Moths. By Mr. C. French, jun.—Eggs of Australian Coot, Black-breasted Plover, Common Heron, White-headed Stilt; also nest and eggs of Orange-fronted Sittella. By Mr. T. S. Hall, M.A.—*Salpa mucronata-democratica*, a pelagic ascidian taken at Black Rock, near Sandringham. By Mr. W. H. F. Hill.—Specimens illustrating developement of *Empusa* (sp.), a fungus parasitic on larvæ of *Agrotis infusa* (Bdv.), and some allied species.

After the usual conversazione the meeting terminated.

FIELD NATURALISTS' CLUB CONVERSAZIONE.

The eleventh conversazione of the Field Naturalists' Club of Victoria was held at the Athenæum Hall, Collins-street, Melbourne, on Thursday and Friday, 14th and 15th June, 1894.

For the first time the committee, taking into consideration that, with the exception of rent of the hall, a two-nights display would not entail more expense than had been incurred on previous occasions for one night, and to the exhibitors would give little, if any, extra trouble, decided to extend the conversazione over two nights and the intervening afternoon, and the experiment proved to be a popular one. Owing to the financial position of the Club not being quite so good as in former years, and to meet the extra expense of rent, the free admission of members' friends was

curtailed; but in order that persons interested should not be debarred from seeing the valuable collections brought together, extra tickets were procurable at one shilling each. This was also an innovation in connection with the Club conversaziones, and, taking into consideration the inclement state of the weather during the currency of the conversazione, the amount taken for admissions must be considered very satisfactory.

The conversazione was inaugurated on Thursday evening with a brief address by Professor Sir Frederick M'Coy, K.C.M.G., D.Sc., F.R.S., one of the patrons of the Club, who expressed the pleasure it gave him to see the splendid display of natural history specimens made by the members, which he considered would do credit to any city in the world, and in calling attention to the various features in the work of the Club, greatly commended the idea of encouraging young people to give some attention to natural history as affording the best field for original work, and the best possible training for the mind and intellect.

A vote of thanks to Professor M'Coy for his address was proposed by Baron Sir F. von Mueller, K.C.M.G., who alluded to the great services of the professor to natural science, particularly in the departments of geology and palæontology, both in England and Victoria. The motion was briefly seconded by Mr. H. T. Tisdall, F.L.S. (President), and carried by acclamation.

A lecturette, entitled "Orchids," was then delivered by Mr. C. A. Topp, M.A., LL B., F.L.S., in the Upper Hall. He briefly described the principal characteristics of orchids, and by referring to diagrams and specimens demonstrated in a most interesting manner the wonderful construction of the flowers of these plants in order to ensure their fertilization by insects.

On Friday afternoon the Rev. W. Fielder delivered a lecturette entitled "The History of an Egg and How to Read it," which was well illustrated by lantern slides, showing the development of chicken embryos, prepared by Mr. R. S. Sugars. The lecturette was well attended and excited considerable interest.

In the evening Mr. A. J. Campbell, F.L.S., briefly recalled the incidents connected with the Club's excursions to Bass Straits with a series of lantern slides of views taken at King Island in 1887, the Kent group in 1890, and the Furneaux group in 1893. These were exceedingly well shown by Mr. J. Searle, and were greatly appreciated.

As a matter of course, the principal feature of the conversazione was the display of natural history specimens in the main hall by members of the Club, which was equal to, if not superior to, former exhibitions. Many of the exhibits were of a highly scientific character. Thus the microscopical members of the Club combined in a systematic exhibit, arranged so as to show as many types as possible of the different orders of the animal and vegetable kingdoms, while the geologists showed a systematic

arrangement of rocks and fossils, principally Victorian. In other departments "life-histories" were prominent features. The exhibits of insects and shells in connection with the recent competition by young collectors also attracted considerable attention.

EXHIBITS.

The following is a list of the contributors, with particulars of the various specimens:—

ANDERSON, E., Armadale—Collection of Victorian Lepidoptera. Coloured and Plain Illustrations of Lepidoptera.

ASHWORTH, H. P. C., Glenferrie—Cases of Mounted Birds. Collection of Birds' Skins. Photographic Views from Furneaux Group, Bass Straits.

BAGE, Mrs. M. C., St. Kilda—Leaf Insect from Fiji.

BARNARD, F. G. A., Kew—Case of Queensland Butterflies. Cases of Victorian Insects.

BIOLOGICAL DEPARTMENT, Melbourne University—Specimens and Apparatus.

BEST, D., Hawthorn—Sixteen cases of Australian Beetles (Coleoptera). Case of Australian Wasps (Hymenoptera).

COLES, A., Melbourne—Collection of Birds' Eggs. Groups of Quail, Eyton's Tree Duck, Wedge-tailed Eagles, Nankeen Kestrel and Grebes, with nests and young. Group of Great Flying Phalangers. Pairs of Shieldrakes, Swainson's Lorikeet, Sombre Gallinule. Jamieson's Gull, Snipe, &c.; also, three dozen bottles containing Grit from Stomachs of various Birds.

COCHRANE, Miss S. W. L., Auburn—Collection of Paintings of Victorian Orchids.

DEGEN, J. J. EDWARD, National Museum, Melbourne—Tablets illustrating the Morphology of Birds. First series—Pterylography of Feathers on Bird's Wing.

ENTOMOLOGICAL BRANCH, AGRICULTURAL DEPARTMENT—Six cases of Life-Histories of Victorian Insects Proof of Plates for Part iii. of "Destructive Insects of Victoria" (French).

ELLEMOR, F. J., Carlton—Three Mounted Skeletons of Birds. Case illustrating Life-History of Lyre Bird. Case of 30 species of Birds.

FERGUSON, W. H., Melbourne—Case of Marine Specimens. Case of Metals.

FIELDER, Rev. W., and Mr. J. SHEPHARD—Demonstrations, Apparatus, and Sections, in illustration of the Development of Chicken Embryos.

FLATOW, Mrs., South Yarra—Collection of Shells, Corals, Seaweeds, &c.

FRENCH, C., F.L.S., South Yarra—Four Cabinet Drawers Australian Lepidoptera Eight Cabinet Drawers Exotic Lepidoptera. Coloured Illustrations of Australian Coleoptera—artist, P. Dattari; and of Rare Longicorn Beetles—artist, C. C. Brittlebank.

FRENCH, C., jun., South Yarra—Large Crocodile from the Nile. Collection of Australian Sea Birds' Eggs.

FROST, C., F.L.S., Kew—Collection of Snakes, Lizards, Spiders, &c. (in spirits).

GABRIEL, J., F.L.S, Abbotsford—250 species of Australian Birds' Eggs, and Collection of Polyzoa.

GABRIEL, Master C. J., Abbotsford—Collection of Mollusca (first prize juvenile competition).

GATLIFF, J. H., Collingwood—Cases of Shells.

GRAYSON, H., St. Kilda—Rock Sections for Microscopic Examination, and Rock Section-cutting Machine (at work).

HALL, R., Box Hill—Collection of Australian Birds' Eggs and Birds' Skins.

HALL, T. S, M.A., University—Geological and Palæontological Collection, Graptolites, &c.

HART, T. S., M.A., Brighton—Geological Specimens.

HILL, W. H. F., Windsor—Fourteen cases of Lepidoptera.

HILL, G. E. F., Windsor—Five cases of Coleoptera.
HILL, Master G. F., Windsor—Cases of Lepidoptera, and Life-Histories of Insects (first prize juvenile competition).
HILL, Master B. F., Windsor—Cases of various Orders of Insects, and of Hymenoptera (first prize juvenile competition).
KEARTLAND, G. A., Carlton—Case of Quail and three cases of Australian Birds.
KERSHAW, W., Windsor—Four cases of Australian Lepidoptera. Four cases of Foreign Lepidoptera.
KITSON, A. E., East Melbourne—Aboriginal Skull. Skull of Tiger. Ethnological and Geological Collection.
LE SOUEF, D., Parkville—Collection of North Queensland Bird Skins, Nests, and Eggs, also Seeds and Native Weapons. Photographic Views of North Queensland and of the Tree-climbing Kangaroos.
MARTIN, Mrs. FLORA, North Brighton—Two Giant Earthworms, from Drouin, 7 ft. 2 in. and 7 ft. 6 in. respectively (measured length).
MASTERS, S. A., Prahran—Collection of 50 species of Victorian Orchids.
MUELLER, Baron F. von, K.C.M.G., South Yarra—Some new plants from Mount Dayman in the Highland of New Guinea, collected by Mr. W. Armitt under the direction of Sir W. Macgregor.
PITCHER, F., Melbourne—Types of 61 species of Victorian Ferns.
PRITCHARD, G. B., Melbourne—Geological Collection. Fossils, &c.
SPRY, F., South Melbourne—Four cases of Australian Lepidoptera.
SUGARS, R. S., Auburn—Set of Lantern Slides illustrating the development of Chicken Embyros.
SWEET, G., Brunswick—General Geological and Palæontological Collection.
TISDALL, H. T., F.L.S., Toorak—Coloured Drawings and Collection of Victorian Fungi.
TURNBULL, Master J., Windsor—Four Cases of Coleoptera (first prize juvenile competition).
WATSON, W., and SONS, 78 Swanston-street—Microscopes, and display of Choice Micro. Specimens. Novelties in Optical Instruments, &c.
WILSON, J., Fitzroy—150 species of Victorian Mosses and Hepaticæ.

Microscopical exhibits were shown by the following:—Messrs. P. H. Anderson, W. H. Archer, H. P. C. Ashworth, F. L. Baker, H. H. Baker, F. Barnard, F. L. Bowen, E. T. Carter, M. H. Clifford, H. Cummins, W. Fielder, J. Gabriel, R. Hall, A. E. Hill, H. R. Hogg, R. J. Larking, D. Le Souëf, W. Macgillivray. W. Mann, G. J. Page, W. Scott, J. Shephard, W. Stone, J. Stickland, W. Stickland, R. S. Sugars, Miss Sweet, H. T. Tisdall, and J. Wilson.

EXCURSION TO HEIDELBERG.

ON Saturday, the 10th March, about ten members met at Collingwood to take part in the excursion to Heidelberg, with pond life for its object. Reaching Heidelberg, the lagoon near the river was visited, and proved to be as prolific in microscopic life as of yore. Very cursory examination showed polyzoa to be plentiful, and freshwater sponge coating floating sticks. A large quantity of free-swimming clusters of the rotifer, *Lacinularia natans*, were obtained from all parts of the pool. This form is interesting in that a few specimens being found on one of the Club's previous excursions it was thought to be new, but it turns out to have been recorded for the first time by Mr. G. Western, F.R.M.S., as found at Guildford, England, being described and provisionally

named in the *Quekett Club Journal*, January, 1891. Mr. Western has seen mounted specimens and drawings of the Australian form, and states his belief that it is identical with the English one. *Lacinularia socialis* was also found, and enabled a comparison being made between the fixed and free-swimming species of the genus.—J. SHEPHARD.

EXCURSION TO BACCHUS MARSH.

THIS excursion, though called Bacchus Marsh, was really arranged for the purpose of visiting the well-known Werribee Gorge—a locality which had previously been explored by the Club, though from a different point of view, viz., ornithology and oology, while on this occasion geology was the line of investigation. The party, which met at Spencer-street at 6.45 on Easter Monday morning, 26th March, was rather small. We were joined at Myrniong, some six miles from Bacchus Marsh, on the Ballarat road, by one of the leaders, the other being unavoidably absent.

Here, at "Dunbar," we found a very cordial welcome and a pressing invitation from Mrs. Brittlebank to a late breakfast (10.30 a.m.) before starting on the work of the day. The situation of "Dunbar" is most picturesque, looking down into the Werribee Valley, with Melbourne and the Dandenong Ranges in the distance and the You Yangs on the right, while much nearer, almost behind us, is Mt. Blackwood.

Since the last Club excursion in these parts the Werribee Gorge has come into prominence as the scene of unmistakable evidences of glacial action, and to see these was the principal object of our visit. Three of our party, however, were bent on photographing some of the rugged cliffs or shaded pools to be found there. After glancing at a large geological map of the Gorge, in order to somewhat fix its features in our minds, we started off down the Myrniong Creek, which for some little distance runs almost parallel, though not straight, with the Werribee, forming, before joining the latter, what is known as "The Island." All the creeks or gullies of the district have steep, rugged banks, consequently geological sections are easily found, and our leader was soon pointing out the various formations, and directing our attention to the stones lying about, many of them striated by the action of ice.

On reaching the junction of the Myrniong Creek and Werribee River, we went a short distance up the latter stream, in order to see an example of a "roche moutonnée," or grooving in the bed-rock, in this case silurian, which had been uncovered some time before by Mr. C. G. Officer. We then started on our scramble down the river, over or round huge stones or fallen masses of rock, generally between precipitous cliffs, showing excellent sections, varying from 150 to 450 and in one place to 620 feet above the bed

of the stream. Many noteworthy geological features were passed on the way. At the lower end of the Gorge, some three miles from the junction with the Myrniong Creek, another "roche moutonnée" was inspected, and portion of it removed for specimens. We then left the river, and making our way up a tributary gully added several more to our collection of striated stones, and thence on to the main road, and so back to Bacchus Marsh.

Though not a locality for a large party, it is to be regretted that so few availed themselves of the advantages of Mr. C. C. Brittlebank's guidance through this most interesting and wonderful place, and which from a scientific point of view will before long rank as one of the show places of Victoria—at any rate, of the Melbourne district. The day was everything that could be desired, as a hot day is felt very severely in so deep a valley, without the rather violent exercise required to make one's way through the masses of stones, whilst the river being very low enabled us to cross and recross just as either bank appeared most comfortable to travel on.

Of zoology and botany little was noted, it being the wrong season of the year. Some eagle's nests were pointed out, high up on a rocky face, and a couple of the birds seen, besides a few other birds. Insects were very scarce. Of plants in flower, the most noticeable were *Phytolacca Americana*, an introduced plant, with spikes of luscious looking fruits, which afforded a juice like red ink on being crushed, hence the common name "ink-weed;" a Callistemon, a Veronica, and a Mimulus; also the curious aquatic plant, *Isoetes Drummondi*. On the rocky sides of a gully, the fern *Gramnitis rutifolia* was noted. The district is one that would well repay a botanist in the spring, as it is probable that several plants at present recorded from north-west Victoria only will be found there.—F. G. A. Barnard.

THE LIST OF VICTORIAN BIRDS.

The June number of the *Geelong Naturalist*, the journal of the Gordon College Field Naturalists' and Science Association, contains a revised edition of the list of Victorian birds originally published in the *Victorian Naturalist*, vol. i. (1884), pages 64 and 74, which has been corrected to date by Mr. A. J. Campbell, F.L.S., and now enumerates 395 species.

Several typographical errors have been corrected, and additions, omissions, and changes in nomenclature have been made as follow:—

ADDITIONS TO LIST.

26*a*. Strix candida, *Tickell*. Grass Owl.
64*a*. Chibia bracteata, *Gould*. Spangled Dronga Shrike.
87*a*. Gerygone culicivora, *Gould*. Western Gerygone.

244*a*. Lopholaimus antarcticus, *Shaw*. Topknot Pigeon.
314*a*. Parra gallinacea, *Temm*. Comb-crested Parra.
326*a*. Anas gibberifrons, *Mull*. Grey Teal.
330*a*. Dendrocygna vagans, *Eyton*. Whistling Tree Duck.
359*a*. Halobæna cœrulea, *Gmel*. Blue Petrel.

OMISSIONS FROM LIST.

112. Cisticola exilis.
113. Cisticola lineocapilla.
202. Orthonyx spinicaudatus.

ALTERATIONS.

39.	Hirundo frontalis ...	read	H. neoxena, *Gld*.
54.	Pardalotus striatus ...	,,	P. ornatus, *Temm*.
59.	Strepera arguta ...	,,	S. melanoptera, *Gld*.
60.	,, anaphonensis	,,	S. cuneicaudacuta, *Vieill*.
69.	Campephaga Jardinii	,,	Edoliisoma tenuirostre, *Jard*.
70.	,, humeralis...	,,	Lalange tricolor, *Swainson*.
83.	Miagra plumbea ...	,,	Myiagra rubecula, *Lath*.
84.	,, rubecula ...	,,	,, nitida, *Gld*.
91.	Petrœca multicolor ...	,,	P. Leggii, *Sharpe*.
94.	Melanodryas cucullata	,,	M. bicolor, *Vig. and Hors*.
101.	Menurus longicaudus	,,	M. Gouldii, *Sharpe*.
137.	Ptenædus ...	,,	Cincloramphus, *Vig. and Hors*.
150.	Oreocincla ...	,,	Geocichla, *Lath*.
151.	Ptilonorhynchus holosericeus ...	,,	P. violaceus, *Vieill*.
156.	Corvus australis ...	,,	Corone australis, *Gld*. (Australian Raven).
157.	Hazel-eyed Crow ...	,,	White-eyed Crow.
205-6-7.	Cacomantis ...	,,	Cuculus, *Lath*.
271.	Charadrius longipes ...	,,	C. fulvus, *Gmel*.
280.	Cladorhynchus pectoralis	,,	Himantopus pectoralis, *Dubus*.
281.	Recurvirostra rubricollis	,,	,, rubricollis, *Temm*.
307.	Demiegretta Greyi ...	,,	D. sacra, *Gmel*.
337.	Lestris Richardsoni ...	,,	Stercorarius crepidatus, *Gmel*.
339.	Sterna poliocercus ...	,,	S. Bergii, *Lecht*.
383.	Podiceps australis ...	,,	P. cristatus, *Linn*.
385.	,, gularis ...	,,	P. Novæ-Hollandiæ.
386.	Chrysocoma catarractes	,,	Catarractes chrysocome, *Lath*.

The list has also been printed separately, and copies can be obtained from the Editor *Geelong Naturalist*, Gordon College, Geelong, at one shilling each.

While on a collecting trip to Cheltenham recently Messrs. S. Masters and C. French, jun., found several specimens of the very rare light red flowered variety of the orchid *Corysanthes unguiculata*.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part IX.

LOPHODES. Gn.

289. L. sinistraria, Gn. (ix., 212, pl. x., 5; Meyr., Proc. Linn. Soc. N.S.W., 620, 1891).
Melbourne, Fernshaw.

MELANODES. Gn.

290. M. anthracitaria, Gn. (ix., 222, pl. ix., 7; Meyr., Proc. Linn. Soc. N.S.W., 622, 1891; *Praxis corvus*, Walk., Noct., 1,087).
Gisborne, Melbourne, Fernshaw.

APOROCTENA. Meyr.

HYBERNIA. Latr.

*291. H. indocilis, Walk. (*Zermizinga indocilisaria* (?), Walk., 1,530; *Hybernia boreophilaria*, Gn., Ent. Mo. Mag., v., 61; *H. indocilis*, Meyr., Proc. Linn. Soc. N.S.W., 923, 1891).
Melbourne, &c.

PSILOSTICHA. Meyr.

292. P. mactaria, Gn. (*Tephrosia mactaria*, Gn., ix., 270; *Boarmia attacta*, Walk., 392; *Tephrosia integraria*, *ib.*, 420; *T. absorpta*, *ib.*, 420; *Psilosticha mactaria*, Meyr., Proc. Linn. Soc. N.S.W., 624, 1891).
Gisborne, Melbourne.

ECTROPIS. Hb.

293. E. pristis, Meyr. (Proc. Linn. Soc. N.S.W., 626, 1891).
Melbourne.

294. E. exsuperata, Walk. (*Boarmia exsuperata*, Walk, 393; *Tephrosia exposita*, *ib.*, 421; *Ectropis exsuperata*, Meyr., Proc. Linn. Soc. N.S.W., 628, 1891).
Melbourne, &c.

295. E. fractaria, Gn. (*Tephrosia fractaria*, Gn., ix., 270; *Hypochroma dissonata*, Walk., 443; *H. nigraria*, Feld., pl. cxxvi., 1; *Ectropis fractaria*, Meyr., Proc. Linn. Soc. N.S.W., 629, 1891).
Melbourne, Gisborne.

TIGRIDOPTERA. H. S.

LOMOGRAPHA. Hb.

DEILINIA. Hb.

TROCHISTIS. Meyr.

296. T. ECCENTRITIS, Meyr. (*Deilinia eccentritis*, Meyr., Proc. Linn. Soc. N.S.W., 635, 1891).
Gisborne, Warragul.

*297. T. LITHODORA, Meyr. (*Deilinia lithodora*, Meyr., *loc. cit.*, 637).
Melbourne.

SCARDAMIA. Gn.

RHINODIA. Gn.

298. R. ROSTRARIA, Gn. (x., 125; *Panagra undiferaria*, Walk., Supp., 1,663; *P. jucundaria*, *ib.*, 1,663; *Stegania allogata*, Feld., pl. cxxxi., 15; *Rhinodia rostraria*, Meyr. Proc. Linn. Soc. N.S.W., 640, 1891).
Melbourne, Fernshaw.

PROBOLOPTERA. Meyr.

IDIODES. Gn.

299. I. PRIMARIA, Walk. (*Acidalia primaria*, Walk., 1,610; *Idiodes primaria*, Meyr., Proc. Linn. Soc. N.S.W., 642, 1891).
Gisborne.

300. I. APICATA, Gn. (ix., 40; *I. mitigata*, *ib.*, 40, pl. xiii., 1; *I. inspirata*, *ib.*, 40; Feld., pl. cxxiv., 3; *I. rinata*, *ib.*, 40; *I. introducta*, Walk., 30; *Tacparia zalissaria*, *ib.*, 234; *Choara siculoides*, *ib.*, 291; *Phallaria conductaria*, *ib.*, 1,525; *P. inductaria*, *ib.*, 1,526; *Idiodes punctiger*, Feld., cxxiv., 4; *I. apicata*, Meyr., Proc. Linn. Soc. N.S.W., 643, 1891).
Melbourne, Gisborne, &c., &c.

METROCAMPA. Latr.

301. M. GLAUCIAS, Meyr. (Proc. Linn. Soc. N.S.W., 644, 1891).
Melbourne, Gisborne.

An earlier name for this species is *biplaga*, Walk. (*Azelina biplaga*, Walk., Char. Undesc. Lep., p. 75, 1869.) Type in National Collection, Melbourne Museum.

*302. M. ADA, Butl. (*Gynopteryx ada*, Butl., Ann. Mag. N. H., 1882, 91; *Metrocampa ada*, Meyr., Proc. Linn., Soc. N.S.W., 645, 1891).
Melbourne, Gisborne, &c.

PLANOLOCHA. Meyr.

303. P. AUTOPTIS, Meyr. (Proc. Linn. Soc. N.S.W., 646, 1891).
Melbourne.

AMELORA. Meyr.

*304. A. AMBLOPA, Meyr., Proc. Linn. Soc. N.S.W., 649, 1891).
Gisborne.

305. A. AUSTRALIS, Ros. (*Odontopera australis*, Ros., Ann. Mag. N. H., 1885, 428, pl. xi., 9; *Amelora australis*, Meyr., Proc. Linn. Soc. N.S.W., 649, 1891).
Melbourne.

*305A. A. MILVARIA, Gn. (*Scodiona milvaria*, Gn. x., 140, pl. viii.; *Amelora milvaria*, Meyr., Proc. Linn. Soc. N.S.W., 650, 1891).
Melbourne.

306. A. AROTRŒA, Meyr. (Proc. Linn. Soc. N.S.W., 651, 1891).
Melbourne, Gisborne.

*306A. A. LEUCANIATA, Gn. (*Liodes leucaniata*, Gn. x., 120, pl. xviii., 3; *Chlenias vittuligera*, Walk., 1,153; *Amelora leucaniata*, Meyr., Proc. Linn. Soc. N.S.W., 651, 1891).
Melbourne, Gisborne, Jindivick, Apsley.

*306B. A. GONIOTA, Meyr. (Proc. Linn. Soc. N.S.W., 647, 1891).
Kewell, Melbourne.

NERITODES. Gn.

307. N. VERRUCATA, Gn. (x., 119, pl. xxii., 8; Meyr., Proc. Linn. Soc. N.S.W., 652, 1891).
Melbourne.

THALAINA. Walk.

308. T. PUNCTILINEA, Walk. (Supp., 228, Meyr., Proc. Linn. Soc. N.S.W., 653, 1891).
Melbourne, Gisborne.

309. T. SELENÆA, Dbld. (*Callimorpha selenæa*, Dbld., Eyre's Disc. Aust., i., 437, pl. v., 3; *Absyrtes magnificaria*, Chen., Nat. Hist. Pap., 5; Gn. x., 226; *Thalaina klenæa*, Walk., Bomb., 660; *T. australiaria*, H. S., Exot., 333; *Thalaina selenæa*, Meyr., Proc. Linn. Soc. N.S.W., 653, 1891).
Melbourne, Gisborne, Oakleigh.

310. T. CLARA, Walk. (Bomb., 660; Meyr., Proc. Linn. Soc. N.S.W., 654, 1891).
Gisborne, Melbourne.

*311. T. ANGULOSA, Walk. (Supp., 289; Meyr., Proc. Linn Soc. N.S.W., 655, 1891).
Moe.

*312. T. INSCRIPTA, Walk. (Bomb., 661; *T. principaria*, H. S., Exot., 446; *Thalaina inscripta*, Meyr., Proc. Linn. Soc. N.S.W., 655, 1891).
Melbourne, Gisborne.

PSEUDOPANTHERA. Hb.

*312A. P. HABROCOSMA, Lower (*Pseudopanthera habrocosma*, Lower, Tr. Roy. Soc. S.A., p. 153, 1893).
Kewell.

MNESAMPELA. Meyr.

313. M. COMARCHA, Meyr. (Proc. Linn. Soc. N.S.W., 656, 1891).
Melbourne, Gisborne, Windsor.

314. M. LENÆA, Meyr. (*loc. cit.*, 657).
Melbourne.

315. M. PRIVATA, Gn. (*Idiodes privata*, Gn., ix., 41, pl. xiv., 4; *Mnesampela privata*, Meyr. (Proc. Linn. Soc. N.S.W., 658, 1891); *Azelina inordinata*, Walk., Char. Und. Lep., 1869).
Melbourne, Gisborne, &c.

316. M. FUCATA, Feld. (*Chlenias fucata*, Feld, pl. cxxiv., 11; *Mnesampela fucata*, Meyr., Proc. Linn. Soc. N.S.W., 658, 1891).
Melbourne.

CRIOMACHA. Meyr.

317. C. BELIDEARIA, Feld. (*Chlenias belidearia*, Feld., pl. cxxvi., 9; *Criomacha belidearia*, Meyr., Proc. Linn. Soc. N.S.W., 659, 1891).
Melbourne, Gisborne.

This species varies from pale yellowish to deepest chocolate. All intermediate forms being found.

STATHMORRHOPA. Meyr.

318. S. BEGGARIA, Gn. (*Chlenias beggaria*, Gn., x., pl. xiv., 2; (?) *P. porphyrinaria*, *ib.*, 237; *Stathmorrhopa beggaria*, Meyr., Proc. Linn. Soc. N.S.W., 660, 1891).
Melbourne, Gisborne, Warragul.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th July, 1894. The president, Mr. H. T. Tisdall, F.L.S., occupied the chair, and some 70 members and visitors were present.

REPORTS.

As leader, Mr. H. T. Tisdall, F.L.S., reported that the excursion to Box Hill on Saturday, 16th June, was well attended. The outing was arranged principally for the study of cryptogamic botany, and the members present succeeded in obtaining a number of interesting species of fungi. Some insect pupæ, probably of saw-flies, were also obtained and removed for rearing at home.

The hon. secretary reported that a meeting for practical work was held on Tuesday evening, 20th June, when Dr. T. Cherry took Bacteria as the subject of a most instructive demonstration, which was closely followed by some twenty microscopists present making observations of the various growths referred to under their instruments.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Hebden and Messrs. R. J. Fletcher, W. M'Caw, and E. R. Peacock were duly elected members of the Club.

OFFICE-BEARERS.

Being the only nomination, Mr. C. Frost, F.L.S., was declared elected as hon. treasurer, in place of Mr. F. Wisewould, resigned.

Mr. F. G. A. Barnard briefly referred to the widespread feeling of regret among the members that Mr. C. French, F.L.S., owing to pressure of departmental duties, had been unable to allow himself to be nominated as an office-bearer for the current year, and thought that his past services deserved some recognition by the Club. He therefore moved—"That this Club desires to place on record its appreciation of the many valuable services rendered it by Mr. C. French, F.L.S., from its inception, in May, 1880, to July, 1894, during which time he continuously held office, either as vice-president, librarian, or member of committee." The resolution was seconded by Mr. H. R. Hogg, and carried by acclamation.

VISITOR.

Before proceeding to the reading of papers, the president said it gave him great pleasure to see Mr. A. H. S. Lucas, M.A.,

B.Sc., a former president, and now an honorary member of the Club, present at the meeting, and extended him a hearty welcome. In responding, Mr. Lucas said he was pleased to find that his short stay in Victoria included a meeting of the Club, and that though a resident of Sydney the doings of the Club were not altogether unknown to him, owing to the receipt of the Club's journal.

PAPERS.

1. By Mr. W. H. Ferguson, entitled "Evidences of the Antiquity of Man in Victoria."

The author described some recent finds of aboriginal implements in the valley of the Hopkins, near Wickliffe, and of the Wannon, at Glen Thompson. A large number of flint knives and tomahawks, millstones, chips of flint, &c., were found in conjunction with bits of mussel shell and a few bones, proving, in the writer's opinion, the existence of pre-historic man in Victoria. The paper was illustrated by diagrams and specimens. Some discussion ensued, in which Messrs. G. Sweet, F.G.S., and T. S. Hall, M.A., took part. While doubt was expressed about the age of the deposits, it was agreed that the evidence brought forward was of the nature required, and it was also pointed out that, although the dingo had usually been supposed to have been introduced by man, its remains have recently been found in association with those of extinct animals, carrying its existence back to the Pleistocene division of the Tertiary period.

2. By Mr. H. T. Tisdall, F.L.S., entitled "Notes on the Genus Calocera," with reference to a supposed new species.

The author briefly defined the characteristics and position of the genus Calocera, and gave a detailed description of the new species, specimens of which were found by two young boys during the Club excursion to Sassafras Gully on last Queen's Birthday, and stated that specimens had been sent to Dr. Cooke, of London, for naming. In discussing the paper Mr. D. M'Alpine, F.C.S., urged the local working out and naming of such additions to our fungus flora.

NATURAL HISTORY NOTES.

Mr. H. Grayson contributed a note on test rulings for microscopic objectives, and stated that lines up to over 100,000 per inch had been successfully ruled by himself on prepared slides.

Mr. A. H. S. Lucas, M.A., B.Sc., brought under the notice of the meeting two aboriginal curiosities from Central Queensland —firstly, a carved "letter-stick" used for tribal intercourse; and, secondly, a humming top made from a gourd by fixing a stick through it for a spindle and burning holes in the sides with a firestick in order to produce sound, being the first instance known of a toy among the aboriginals.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening :—By Mr. F. G. A. Barnard.—Case of Queensland butterflies. By Mr. A. Coles.—Pair of Black-backed Crow Shrikes, *Gymnorhina tibicen* ; 20 coloured plates of Australian birds' eggs; and stomach of Black-backed Crow Shrike containing wheat, in support of a statement made by exhibitor at a previous meeting. By Mr. C. French, jun.—Three eggs of *Aquila audax*, from the Wimmera, showing the variation in colour of the eggs. By Mr. H. Grayson. —Test rulings for microscopical purposes executed by exhibitor. By Baron von Mueller, K.C.M.G.—New plants from mountainous parts of British New Guinea, collected in Sir W. M'Gregor's travels, and including two species of Quercus; a species of Acaena, the genus being new as Papuan ; *Haloragis micrantha* and another species new as Papuan ; Akama, new as Papuan ; three species of Rhododendron ; Vaccinum, of the section Agapetes ; a Corysanthes, for the first time from New Guinea ; a supposed new Fern tree, *Cyathea mimosacea*, remarkable for even the ultimate frond segments being stalked ; a very tall Spiridens Moss, fully a foot high ; also a Dawsonia Moss over a foot high. By Mr. G. J. Page.—Microscopic slide of Fossil Sponge Spicules from coal shaft near Williamstown. By Mr. J. Shephard.—Stage micrometers and test plates for microscopic objectives, ruled by exhibitor.

After the usual conversazione the meeting terminated.

EXCURSION TO PICNIC POINT (HAMPTON).

On Saturday afternoon, 17th February, a party of Field Naturalists met at the Brighton Beach station, *en route* for Picnic Point, which had been decided upon as a suitable locality in which to inaugurate a series of trawling expeditions for the purpose of capturing some of the larval forms which swarm in the bay at this season of the year. On arrival at the starting point some difficulty was experienced in obtaining boat accommodation, and eventually it was arranged that half the party should confine their operations to marine trawling, whilst the other half should scan the shore in search of those forms which live between high and low water marks. As the party in the boat included a diatomist, an effort was made to reach the deeper water, so as to obtain some of the mud, which is known to be very rich in diatom life. The trawling apparatus was also let down. This consisted of a cone of muslin about 36 inches long and 21 inches across the open end. A large lamp chimney was fixed at the apex of the cone with its broader end outermost, covered with muslin. Cork and lead weights were so arranged that the whole apparatus floated in a fairly horizontal position near the surface, and thus a

stream of water passed through, carrying the animals to the muslin screen. From time to time the glass tube was detached, and the captures, with as much water as desired, poured into jars. In use it was found that the most minute objects were readily secured by this contrivance, which was slightly modified by Mr. Shephard after a description by Dr. Giles in "Science Gossip for 1886," page 52.

The deeper water did not yield very satisfactory results either for dredging or trawling, so a turn was made for home. On reaching shallower water larval forms were in abundance, but time did not permit of extended operations, and as the land party were awaiting our return we reluctantly put in to shore.

Once at home the microscope revealed a good many interesting forms, amongst which may be mentioned some three species of Medusæ, echinoderm larvæ, crustacean larvæ, fish ova, and a Radiolarian. Two small specimens of Hippocampus were also secured, and, taken altogether, the trip was indicative of what can be done in this direction by members of the Club.—W. Fielder.

EXCURSION TO MERRI CREEK, COBURG.

The excursion to the Merri Creek, Coburg, for geology, on Saturday, 24th April, had the misfortune to fall on an afternoon which had been preceded by a wet morning, the afternoon threatening a repetition of the morning's rain, consequently the party which met at Coburg railway station was rather small. However, we decided to carry out the afternoon's programme, and made a start towards the creek, which we struck a little to the south-east of the Deanery. The basalt shown in the creek, hereabouts, is of a massive character, the upper parts exhibiting a decided tendency towards stratified structure; and it occupies a depression in the Upper Silurian rocks, probably caused by their erosion or denudation previous to its deposition. The Silurian rocks are still observed to bound the basalt a little lower down the creek. The dip, strike, and general characters of the Silurian rocks were noted, but no fossils were, however, observed in them. Continuing along the course of the creek to near the Newlands Bridge, where the basalt again reposes on what was, at the time of its outflow, surface soil, it was observed that this soil had assumed a columnar form for a depth of from a few inches to two feet on the under surface of the basalt flow, and this was observed to be continuous for several yards—indeed, as far as the undisturbed stratum was seen. These miniature columns were found to be approximately vertical, and about the size of an ordinary writing pencil, having four and five sides. From here, the party proceeded to the east of the boundary wall of the Pentridge Stockade, along the course of the creek, where an excellent example of the

different forms assumed by columnar basalt can be seen. The surface was observed to have some remnants of lava lying in the soil. Below this occurs a stratum of amorphous basalt, exhibiting here and there nodular appearances; and, underneath this again, the columnar basalt. The columns occupy various angles, from vertical in the centre to a near approach to a horizontal position on either side, the flanking columns inclining towards the centre of the mass. These occur on the west side of the creek, between it and the Stockade wall. Just across from here, on the east side of the creek, a very good example of a pavement of geometric design is seen, caused by fracture of the columns along an approximately horizontal plane, which has cut the columns transversely, showing a section of each individual column; these are seen to have 4, 5, 6, and 7 sides, the majority being 5-sided. The search for Zeolites, which occur in this basalt, next occupied our attention, and close by we found other curiosity seekers breaking stones in the hope of securing Zeolites for sale. Not far off, to the east, the basalt is again bounded by Upper Silurian strata, up the small gullies of which gold is reported to have been found a few days previously, and several visitors were out to see the place; but it seems to be unknown whether this gold occurs in the Silurian rocks themselves or has come from some of the Tertiary gravels that occupy the summit of the hill immediately to the east. Returning homewards we supplemented the excursion by spending an hour in examining a private collection of some interesting Australian fossils.—G. SWEET.

COCOON MAKERS AND COCOON BREAKERS.

By ERNEST ANDERSON.

(Read before Field Naturalists' Club of Victoria, 12th March, 1894.)

ONE of the first things we learn from entomological works is the universal metamorphosis of insects—that is to say, the transition through the various stages of ovum, larva, pupa, and perfect insect, and a mass of information may be gleaned from different sources on these various stages; but when a short time since I was seeking for some definite and detailed account as to the manner in which those Lepidoptera which construct compact and hard cocoons free themselves, I could find little but vague generalities on the subject.

Professor Duncan, in his extremely interesting and popular work, "The Transformations of Insects," speaking of the Lepidoptera, says:—"Immediately after the insect has burst from the pupa case it suspends itself in a vertical position," but on the subject of of how it does burst from the pupa case he is silent.

Figuier, in referring to the species which construct cocoons, says:—"Those pupæ enclosed in cocoons free themselves entirely

or in part from their old skin in the shell itself, but the imago is still a prisoner. It has broken through a first enclosure ; it must open itself a way through the second. How does it manage to bore through the often very solid walls of this second prison, so as to regain its liberty ? "

Reaumur states that in the Lackey Moth *(Bombyx neustria)* the head is the only instrument of which the insect makes use in opening a passage, the compound eyes then acting like files. These files cut the very fine threads of which the cocoon is composed, and as soon as the end of the cocoon is pierced through, the insect uses its thorax like a wedge to enlarge the hole. The Lackey Moth, however, only constructs a leathery sort of cocoon, so that, even if Reaumur's explanation is correct, it would hardly apply to such species as the European Puss Moth *(Dicranura vinula)* or our own *Antheræa eucalypti*, which constructs for its cocoon those hard oval excrescences so familiar on our young gum trees.

Cocoon of *A. eucalypti.*

The largest amount of information on the subject I found in that most delightful of works to an entomologist, "The Introduction to Entomology," by Kirby and Spence, in their chapter on the extrication of the perfect insect from the puparium, or pupa case, and from the cocoon. Under this heading they deal very exhaustively, and I believe correctly, with most families, and I shall quote them somewhat freely later on.

Now, although we could very profitably and pleasantly devote some time to the various descriptions of pupæ and cocoons, as this paper more particularly concerns those enclosed in hard coverings, we shall only need to refer to the others very slightly.

The greater number are very simple, and include the butterflies, the Geometers, and most of the Noctuas. In these forms, when the enclosed insect is ready to emerge, its struggles, and a certain amount of inflation it is capable of, cause the pupa case to split down the thorax, and the insect then forces its way out, the case having become very thin and fragile ; sometimes, instead of splitting down the thorax, the entire covering of the legs and antennæ is thrust out, but in either case the operation is easy, and, the pupa case once broken, the moth or butterfly has nothing more to do than to suspend itself in a convenient posture and develope its limp wings.

The species inhabiting reeds or trees are furnished with spines or bristles on the segments, which enable them to work their way to the exit previously prepared by the larva, while subterranean pupæ likewise have the power of working towards the surface,

generally along the burrow made by the larva in its descent. We have now to consider those species in which the chrysalis is enveloped by a cocoon of silk, silk and leaves united, or of chips of wood intermixed and cemented together by the spinnings and gummy secretions of the caterpillar. Some of these silken cocoons are so flimsy and frail that it must be an easy task to escape from them; others, however, are denser, and at first sight it would seem a somewhat hard task for the moth to escape, but on investigation we find they are constructed in such a manner as to readily allow the escape of anything from the inside, though the admission of an enemy from the outside is almost impossible. This result is arrived at by the caterpillar constructing an inner pear-shaped cocoon having a series of threads all converging to a point in a manner similar to the baskets used for catching lobsters, &c. Familiar examples of this description of cocoon may be seen in our grass feeders, *Darala ocellata* and *D. denticulata.*

Cocoon of *D. denticulata.*

In another type, some species, such as our *Limacodes longerans*, construct a perfectly oval or circular retreat, which, however, has a sort of lid at one end; the lid is but slightly joined to the body of the cocoon, and easily gives to pressure.

Cocoons of *L. longerans.*

This brings us to those species in which the caterpillar apparently has no thought for the morrow, but concentrates all its energies in entirely enveloping itself by a mass of silky or hard material; so hard, indeed, are the cocoons of some species that it takes a strong and very sharp knife to make any impression upon them. I remember when first some cocoons of the Puss Moth came into my possession many years ago, that I could not rest in my mind about them—they were so hard that it seemed impossible for such a downy, soft-looking object as the Puss Moth ever to get through. After anxious thought I struck what seemed the brilliant idea that the storms of winter and general influence of exposure to the elements in a state of nature gradually softened the cocoons, so that when spring once more arrived the moth found its task an easy one. Acting upon these conclusions I treated mine to an artificial winter, frequently drenched them with water, and generally made things as wintry as possible for them, short of putting them outside. However, I found they were still as hard as ever, and finally, distrusting Nature, I cut an opening in each cocoon, feeling sure that unless I did so I should lose all my moths.

Before proceeding further it will perhaps be as well to quote

what Kirby and Spence say on the subject. Here is the passage:—"I am next to give you some account of the second mode in which the release of the perfect insect from its cocoon is effected—that, namely, wherein its own exertions chiefly accomplish the work. The texture of the cocoon of the silkworm moth is uniform in every part, and the layers of silk are equally thick at both ends. The moth makes its way out by cutting or breaking these threads at the end opposite to its head. The question is, what instruments does the moth employ to effect this? Malpighi asserts that the animal first wets the silk with a liquid calculated to dissolve the gum that connects the threads, and then employs its lengthened head to push them aside and make an opening. But, as Reaumur has observed, we find the threads not merely pushed to each side but actually cut asunder. He therefore infers that the eyes, which are the only hard organs of the head, are the instruments by which the threads are divided, their numerous minute facets serving the purpose of a fine file. Reaumur's correctness cannot be suspected, and he affirms that from observation there can scarcely be a doubt that most of the threads are broken. We are, however, informed by Dr. Roxburgh that *Attacus paphia*, when prepared to assume the imago, discharges from its mouth a large quantity of liquid, with which the upper end of the case is so perfectly softened as to enable the moth to work its way out in a very short space of time—an operation which, he says, is always performed in the night. Perhaps the two opinions may be reconciled by supposing the silkworm first to moisten and then break the threads of its cocoon. In those that are of a slighter texture, a mere push against the moistened end is probably sufficient, and hence we find in so many newly disclosed moths the hair in that part wet and closely pressed down. If it be apparently difficult for the silkworm moth to effect an opening in its cocoon, how much harder must seem the task of the Puss Moth, *Dicranula vinula*, to pierce the solid walls of its wood-thickened case? Here the eyes are clearly incompetent; nor could any ordinary fluid assist their operation, for the gum which unites the ligneous particles is indissoluble in aqueous menstrua. You begin to tremble for the fate of the moth incarcerated in such an impervious dungeon—but without cause: what an aqueous solvent cannot effect, an acid is competent to; and with a bag of such acid our moth is furnished. The contents of this she pours out as soon as she has forced her head through the skin of the chrysalis, and upon the opposite end of the cocoon. The acid instantly acts upon the gum, loosens the cohesion of the grains of wood, and a very gentle effort suffices to push down what was a minute ago so strong a barrier. How admirable and effectual a provision!"

The foregoing somewhat lengthy extract shows the conclusions

arrived at by the learned authors mentioned, and apparently but little advance has been made up to the present. Reaumur, however, was right when he said the threads were cut or broken, though altogether wrong in suggesting that it was the eyes of the moth that were used in the operation.

If we look at a specimen of *Antheræa eucalypti* we observe that the head is very small, and the thorax almost truncate—in fact, nothing less likely to serve as a wedge can well be imagined. The moth is very common; most entomologists here must have bred it, and many doubtless are familiar with the chipping or tearing sound which may be heard for some time previous to the moth's appearance. Now, this tearing sound and evident strenuous exertion for a period extending over two or more hours is hardly consistent with the acid theory and the "gentle effort required to push down what was previously so strong a barrier." Moreover, as far as I have been able to experiment, the Antherea does not emit any fluid capable of softening the cocoon. I have tried the fluid invariably found in the cocoon after emergence, upon various parts of it, but with no effect; neither is it affected by hot water or chloroform.

Head and thorax of *A. eucalypti.*

It might be thought possible for the insect to carve a way out by means of its claws, but the position of the legs precludes their being of any use, as there is not room enough to allow of their action. It is to the wings we have to look for an explanation of the mystery.

On the primaries, where the nervures converge together at the base, may be found a sickle-shaped projection, sharp at the point and extremely hard; it is with these instruments, on either side, that the enclosed moth effects its deliverance.

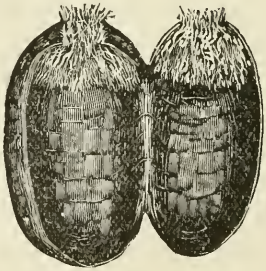
When ready to emerge, the insect by movements of the wings and legs bursts the upper portion of the pupa case into small fragments, which are then worked downwards, leaving the insect free to commence its attack upon the walls of its prison.

Moth before emergence, showing sickles in position.

At first a series of longitudinal scratches are made, which eventually convert the smooth inside of the cocoon at the top into a mass of tangled fibre; this has the effect of thinning the walls, and also of giving a better hold to the insect in its next and most important operation of cutting out a circular opening

sufficiently large to permit of its escape. This is managed by the insect revolving round and round, at the same time by movements of the wings thrusting the sickle-like projections through the cocoon, cutting and breaking the strands of which it is composed. The rapidity and power with which this is done is almost incredible, and the noise made more resembles the gnawing of a rat than anything else. When, by repeated thrusts, the moth has made a weak line round the cocoon, it commences to butt against the top in order to push the piece right out. At first this only yields a little, being still held by many strands, but, as the insect still keeps up its cutting exertions, the strands are gradually severed, and the top is either thrust right off, or being held on one side only turns back like a lid, the insect at once drawing itself through the opening, and suspending itself for further development. The time taken is never less than two hours of incessant labour, and frequently much longer. When the moth first emerges the little sickles are very conspicuous, but after it has completed its development they are completely hidden by the downy covering of the thorax and base of wings.

Interior of cocoon of *A. eucalypti* before emergence.



Interior of cocoon after emergence.

Such is the method by which the *Antheræa eucalypti* breaks through its cocoon, a method probably universal to the species of the group, including the silk producers, *Attacus yama-mai*, *A. pernyi*, *A. mylitta*, &c.

A species of Hymenoptera parasitic on the *Antheræa eucalypti* is likewise a cocoon breaker. Although as many as 18 or 20 are sometimes feeding inside a single caterpillar, it generally manages to construct its cocoon before its insidious enemies finally destroy it, and consequently, when the parasites have devoured their host, they find themselves enclosed within the compact walls which resulted from its last exertions.

Now in many cases, where a number of parasites exist in one host, we find the first one emerging makes an exit for itself through which all its companions subsequently follow. In the

present case, however, no such economy of labour is found, for the parasites of the Antheræa fill up the interior of the cocoon with a series of cells, arranged in a very haphazard manner, but each parasite having a cell to itself; this accomplished they rest secure in the habitation thus unknowingly provided for them until the time when young Antheræa larvæ are once more about. Owing to this arrangement of single cells each fly has to make an opening for itself, and this is effected with the strong mandibles which the insects possess. Like the Antheræa, a revolving motion is maintained during the action, by which means a neat exit is finally made.

The apparatus used by *Cosmotriche vitulina*, Don, another moth constructing a hard cocoon, is upon the same principle, but in this case instead of having the instrument placed upon the wings, it is formed by an extension of the scapulæ.

I had intended to have investigated the external anatomy of several more species before bringing forward these notes, but on consideration I thought it best to put before you my observations up to date, and I think that if others having opportunities to investigate the subject will take the trouble to do so it will be found that the strongest and most useful part of a cocoon-making lepidopterous insect is the base of the wings, where the costal, median, and sub-median nervures are united into a solid corneous mass, and that the plausible and generally accepted theory of an acid secretion has little foundation in actual fact—the fluid which is observed being universal to all pupæ, including those which are not closed at all. It is probably not secreted by the perfect insect, but is the surplus moisture over that required for a proper development. The empty pupæ cases of the Hawk Moths are frequently half full of liquid; especially is this the case with *C. celerio*, which has a large chrysalis compared with the size of the insect, and as this species makes but the merest attempt at a cocoon—in fact, frequently simply pupates on the surface—it cannot have any connection with its escape. On the other hand, we sometimes observe specimens which, through having been fed on dried-up food, are devoid of sufficient moisture, and these are generally cripples—that is, although they can escape from their cocoons or chrysalis without the aid of moisture, they cannot properly develop their wings, which are therefore crumpled or deformed. It must also be remembered that the tongue of a moth, while in the pupa case, is extended from the head downward and sheathed all the way; it is not until after its escape that the insect can make use of it or coil it up, so that no secretion could be applied from the mouth or tongue. The question is one of some interest, and I shall be very glad to hear the opinions or experiences of brother entomologists with cocoon-making moths, either Australian or foreign.

NOTES.

On the Occurrence of a Species of Salp in Port Phillip. —On a recent visit to Black Rock, near Beaumaris, I found the beach strewn for two or three miles with specimens of a Salp. In many places they formed a band about five or six inches broad along the sand, where they had been thrown up by the waves. In the water they could be seen floating about in chains up to a length of six inches. Unfortunately, I was without any means of preserving them, and had to leave them there. I returned on the following day with the necessary jars, but found that only a few stragglers of the immense shoal remained. I collected as many as I could find, and, by filling my jars with sea-water, was enabled to bring them alive to the University on the following day. The chains which they form are easily broken, and none of the individuals remained long in contact. Their swimming powers are fairly active, and they move either backwards or forwards with a succession of jerks, by suddenly contracting the muscle-bands round the body, and thus driving the water out of either end at will. At times they performed a rapid somersault backwards. Under the microscope the rapid movement of the cilia on the endostyle was clearly noticeable. The mantle wall was full of lath-shaped crystals, either single or united in all degrees of complexity up to closely rayed stars. Certain species of of Salps possess siliceous spicules in the test; but as these were crystals, and were readily soluble in dilute acid, without effervescence, I am at a loss as to their true nature. They are not a *post-mortem* development, as the Rev. W. Fielder noticed them in the living specimens. A comparison with figures of *Salpa democratica-mucronata* showed that our specimens must be referred to this species, as the form of the body and the arrangement of the muscle bands are identical. This species was obtained in Bass Strait, and off Port Jackson, in great numbers by the *Challenger*, but the occurrence of such a strictly pelagic form in a land-locked harbour like Port Phillip must always be a rarity, for which it will be well for the biological members of the Club to be on the alert.—T. S. Hall. Melbourne University, 11th June, 1894.

Baron F. von Mueller, K.C.M.G., has been elected member of the French Institute, in succession to the famous botanist, the late Alphonse de Candolle. The distinction is one highly valued by men of science, and ranks next to that of the gold medal of the Royal Society of England.

Errata.—On page 44, lines 1 and 2, for "Columbidæ" read "Colymbidæ." On page 56, line 21, for "Menurus" read "Malurus."

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th August, 1894. The president, Mr. H. T. Tisdall, F.L.S., occupied the chair, and some 80 members and visitors were present.

REPORT.

The hon. secretary reported that a meeting for practical work was held on Monday evening, the 23rd July, when the "Bean Plant," a type of the course in structural botany, was studied under the direction of Mr. J. Shephard.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. D. B. Ferguson, R. Harvie, and A. H. Westley were duly elected members of the Club.

GENERAL BUSINESS.

The Chairman referred to the great distinction which had been recently conferred on one of the patrons of the Club, Baron Sir F. von Mueller, K.C.M.G., by the French Institute, in electing him a member in succession to the late Alphonse de Candolle, and read a biographical notice written some thirty years ago by the late Rev. Dr. Woolls, F.L.S. It was unanimously decided to convey the congratulations of the Club to Baron von Mueller.

PAPER.

By Rev. Walter Fielder, entitled "A Study of Professor Drummond's Ascent of Man."

Many of the more impressive and eloquent passages of this notable work were quoted, and the chief contentions were endorsed by the reader. The pedigree of man, as revealed by embryology, was held to be compatible only with the doctrine of evolution, and to be in reality not a descent or degradation, but a great exaltation, and, further, that evolution having produced man had reached its climax.

An animated discussion followed, in which Messrs. Anderson, Coles, Cox, Kitson, Shephard, and Rev. Mr. Rammage took part.

PROTECTION OF MAGPIES.

In consequence of a communication from the Customs Department, a discussion was invited on the subject "Should Magpies be Protected?" The matter was brought forward by the receipt of a complaint from a resident of Mitcham, that the Magpies were eating all the maize crops, and were as large as hens in that district.

Mr. Frost explained that he had visited Mitcham in company with the hon. secretary on the previous day, and on inquiry they had found the complaint to be founded only on the non-appearance of a small crop of maize some three years ago. This was put down to the Magpies, but the evidence is discounted by the fact that the soil for miles round is too poor for crops of any description.

Mr. A. Coles stated that magpies occasionally eat grain, and that large numbers were being killed by the poisoned wheat laid for rabbits; the stomach of one containing several grains of wheat was exhibited by him at the July meeting of the Club.

The discussion was all in favour of the continued protection of the birds, as any slight damage is more than compensated for by the immense amount of good done in destroying insect pests.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening :—By Mr. F. Barnard.—Microscopical Slides of Sponge Spicules and Foraminifera, from Newport coal shaft. By Mr. A. Coles.—Sheet of 101 eggs of the insectivorous Birds of Victoria, hand-painted in life colours, suitable for State schools. By Mr. C. French, jun.—Pair Mallee Hen eggs, also abnormal egg of same, collected in the Wimmera. By Mr. J. Gabriel.—Eggs of the Great Skua (*Stercorarius antarcticus*) from Kerguelen Islands; the birds are occasional visitors to Victorian waters. By Mr. T. A. Masters.—Specimens of Orchid *Pterostylis longifolia*. By Mr. G. J. Page.—Microscopic Slides of Foraminifera from Port Phillip Bay, transparent and opaque, and from coal shaft near Williamstown, opaque.

After the usual conversazione the meeting terminated.

THE VOLCANIC ROCKS OF THE MELBOURNE DISTRICT.

By T. S. Hart, M.A.

(Read before the Field Naturalists' Club of Victoria, 12th March, 1894.)

The prevailing rock formation of the country to the north and north-east of Melbourne for some distance is volcanic, forming extensive plains from the Plenty River and the upper parts of the Merri Creek and Deep Creek, in a south-westerly direction. They are bounded by and occupy hollows in the Palæozoic rocks, spurs of which reach down into the upper parts of the plains, but in the lower parts they are completely covered, except a few small areas where they reach a higher level or where the streams have cut through the basalt. The underlying rocks also include extensive deposits of Tertiary age in the lower parts, frequently

forming a regular line along both sides of the valleys under the basalt, and at some places Older Volcanic rocks.

These Older Volcanic rocks are divided into two groups in the geological survey maps—Older Volcanic and Lower New Volcanic. The largest area near Melbourne lies along and to the east of the Saltwater River, and reaches down to Melbourne, reappearing beyond the Yarra as Emerald Hill. The greater part of it is coloured and lettered on the maps as Older Volcanic, the south-east end is coloured and lettered as Lower New Volcanic, and the middle is coloured Lower New Volcanic and lettered Older Volcanic. It appears to be overlaid at South Melbourne by the same Tertiaries as on the Saltwater River, and though a small patch of clay coloured as Tertiary is shown underlying one part, it is a deposit containing fossil leaves quite different from that overlying the other part. As a rule the basalt is much decomposed, often weathering in concentric shells, as at North Melbourne. On the Moonee Ponds Creek, near Essendon, it may be seen in some quarries undecomposed—a dense black basalt. Other small areas of Older Volcanic rocks occur higher up the Saltwater. At the Green Gully, south of Keilor, the relations of the Silurian, Older Volcanic, Tertiary, and New Volcanic may be well seen. Another small patch occurs in the Spring Creek, east of Keilor, and a small patch in the Saltwater above that township. It also appears in a gully south-east of Sunbury Hill, where it is not shown on the maps, and the maps show three more small patches on the Emu Creek, east of Sunbury. In a quarry on the side of the Moonee Ponds Creek, above Broadmeadows, the columnar structure is distinctly seen; and also in the bed of the creek, just above this, there are very small columns, up to two inches diameter, of dense black basalt. Another patch occurs on the same creek at Pascoe Vale. A small area on the Deep Creek, above Bulla, is marked as Lower New Volcanic.

Several small outliers of basalt occur near Greensborough, on the Plenty River, where they are considered to be Lower New Volcanic as they seem to overlie the Tertiaries (though this is not certain), and have evidently been deeply eroded before the lava streams covered the plains, as these extend into some of the valleys between them. These are remnants, probably, of a once more widespread lava stream. The Sugarloaf Hill north of Heidelberg appears to have been once the bottom of a valley which has been filled by a lava stream. The basalt has since been removed, but the bed of the stream, with the drift in the hollows of the rock, all much hardened, remains as the top of the hill. Other small areas of volcanic rocks occur higher up the Yarra Valley, and at Lilydale there is a well-defined point of eruption. On the other side of the Dandenong Ranges Older Volcanic rocks occur at Harkaway and Berwick. At Wilson's

Quarry, Berwick, they overlie a deposit containing numerous fossil leaves, which seems to have been still in progress at the time of the lava flow. To the south they pass under Tertiary deposits, and may be continuous with the basalt found under 200 feet of Tertiaries at Mordialloc.

We thus see from the sections round Melbourne that there is a series of older volcanic rocks overlaid by marine Tertiaries, and perhaps a second series before the Newer Volcanic. The age of the first series of volcanic rocks has been put down as the close of the Miocene, the Tertiaries overlying them being regarded as Pliocene. But Messrs. Hall and Pritchard have recently shown ("Proc. Royal Soc. of Vic.," vol. ii., N.S.) that the Eocene strata at Bellarine rest on the denuded surface of similar volcanic rocks, and in other localities also the same relation exists. Further palæontological examination of the Tertiaries round Melbourne also tends to assign to them an earlier age.

Coming now to the Newer Volcanic rocks, we find that for the most part they form open plains with a shallow soil, and frequently very stony. The rock is for the most part basalt, varying in colour and texture at different places. It may be seen in section along most of the creeks and rivers in the plains, sometimes to a thickness of 100 feet; but over the old valleys it may often be much thicker. Points of eruption are very common, mostly in the upper parts, the nearest to Melbourne being one to the north-west of Somerton station, on the North-Eastern line. The lava streams have filled in the valleys, and have sometimes covered the hills dividing them. By this the drainage system of the country has been considerably modified. When a valley has been partly filled by a lava stream, it frequently happens that the river has cut out a new course along one side, the Silurian rocks being more easily denuded than the basalt; many instances of this occur. The Yarra occupies the boundary line between the basalt and Silurian from Alphington to Prince's Bridge, the basalt only once crossing to the left side of the river, at Hawthorn. The Saltwater above Sunbury, and the Deep Creek in the parish of Darraweit Guim, are other examples. The upper parts of each of the valleys as a rule contain several points of eruption—though it is not always clear how much of the basalt is due to each—and from these the basalt has flowed over the plains. In the upper parts of the Merri Creek there are seven points of eruption recorded in the quarter sheets. In one of these, Beveridge Hill, there is a distinct though much worn down crater, with a swamp in it. On one side there is a cutting in ash and scoriæ, near the Sydney road. Down the middle of the Merri Creek valley there is a line of inliers of Silurian rock which probably mark an old division of the valley into two. On both sides of the volcanic area there is a line of

Silurian hills, so that the Merri Creek receives the water from very little beyond the volcanic plain. Near Donnybrook the creek, which has been following the east edge of the plain, turns across it in a south-westerly direction, passing between two points of eruption; one of these (in Kalkallo, 21) marks the dividing line between the Plenty River and Merri Creek. It is not a large hill, but from the slope of the country it seems. probable that its lava streams are very extensive. The Darebin Creek heads from it, and a note on the geological map gives it as the source of the lava streams to the south. From this point the lava streams extend to the east into the Plenty Valley; thence southward down a narrow valley in the Silurian rocks west of the present Plenty River, joining the main basaltic area south of Morang; and it appears not unlikely that the basaltic strip which goes from there down the Darebin Creek and the Yarra to Prince's Bridge may come from the same source. The width of the old valleys here seems quite out of proportion to the streams which flow down them: the Plenty River old valley is represented by a strip of basalt scarcely a mile wide, while on the other side of the Morang Hills the Darebin and Merri occupy a basaltic plain seven miles wide. The Plenty, and all its tributaries that meet the basalt, show extensive alluvial deposits above it, as if their flow had been checked; and it seems probable that all these tributaries formerly passed to the west of the Morang Hills, and perhaps the Plenty itself turned in the same direction.

To the west of the Merri Creek, and above the heads of the Moonee Ponds Creek, is another group of four volcanic hills. One of these, in sections 13 and 17 of the parish of Yuroke, has its surface strewn with numerous blocks of scoria and a little ash, with a few ejected blocks of granite and sandstone. Across the top of this hill there are two basalt dykes standing up above the hill. Two other points of eruption occur in section 20 of the same parish, from which creeks run west and north-west to the Deep Creek, south to the Moonee Ponds, and east to the Merri. The lava streams from this hill probably extend round the granitic area to the south, and down the south-west side of the Moonee Ponds Creek.

In the ranges at the head of the Deep Creek there is a point of eruption—the Jim-Jim, on the top of the Dividing Range—and two others a few miles lower down. In the neighbourhood of Lancefield there are several, and to the south-east, in the parish of Springfield, there are several more.

South of the Saltwater River, and north of the heads of the Toolern Toolern and Kororoit Creeks, and from there to Diggers' Rest, there is a line of volcanic hills, one of which, Mt. Aitken, reaches a height of 1,680 feet. These are all much denuded; on some of them indistinct outlines of a crater can be traced. One

of them, Sunbury Hill, has had extensive excavations made in it to level a site for the Lunatic Asylum. The excavations show a peculiar scoriaceous rock, probably indurated ash, and at several places portions of lava streams are exposed on the surface of the hill.

In the valleys of the Kororoit Creek and the Werribee, below Melton, the volcanic rocks are almost the only ones that appear: at one place, near Mount Mary, a creek shows over 100 feet in a section. But near the mouth of the Werribee the basalt is overlaid by a deposit marked as "Upper Brighton Beds." This, I think, refers to the deposit which forms the surface at Brighton—not the same "Upper Brighton Beds" as occur elsewhere between the Newer and Older Volcanic.

The Newer Volcanic rocks have been cut through by the rivers till in places they run in gorges over 100 feet deep, so that a considerable time must have elapsed since their outpouring. Though they are usually considered as marking the close of the Pliocene period, the referring of the underlying rocks to an older age makes it possible that they too are older, and a comparison of the surface of the Tertiary on which they rest with the hills and valleys into which the same have been worn where not protected, seems to indicate that the time between their formation and the lava flows was short compared with the time that has elapsed since. It would appear that the Tertiaries had suffered very little erosion before the lava streams covered them, and the outpouring of lava may have occurred simultaneously with the rising of the land.

SOME REFERENCES TO LITERATURE DEALING WITH GRAPTOLITES.

INSTEAD of forwarding for publication a few unsatisfactory notes on the subject matter of my remarks on Graptolites before a recent meeting of the Club, I have thought that some hints on the literature of the group will be of use. As Graptolites occur in many of the countries of Europe and America, and as so many of the species have a world-wide range, the literature is much scattered, and many of the important papers are inaccessible in Melbourne.

As regards the structure of the group, Nicholson and Lydekker's "Palæontology" and Zittell's "Handbuch der Palæontologie" will be found useful. Both are in the Melbourne Public Library. A paper by Dr. Otto Herrmann, in the *Geological Magazine* for 1885, gives some information of great value. This publication is in the Club's library, the first volume of the set there being that for 1882. The earlier volumes of the *Geological Magazine* contain many valuable papers on the subject, but, strange to say, are not to be found in any of the Melbourne libraries. As so many of Lapworth's papers dealing with classification and

with descriptions of the Monograptidæ are contained in the volumes of this magazine, their absence is a great calamity.

References to descriptions of species and genera will be found in Etheridge's "Catalogue of British Palæozoic Fossils" (Public Library, University Library). Lapworth's classical papers on the "Geological Distribution of the Rhabdophora," give, in a remarkably clear manner, all that was known at that time of their distribution. It is owing to Lapworth, above all others, that we are in a position to use Graptolites, as we can, in subdividing the rocks in which they occur. These papers will be found in the "Annals and Magazine of Natural History," ser. 5, vols. iii., iv., v., and vi., and are in the Public Library.

Prof. James Hall's work on the Graptolites of the Quebec group in Canada is only to be seen in the University Library. It contains beautiful figures of a great number of species.

Prof. Sir F. M'Coy has described and figured several of our Victorian forms in the "Prodromus of the Palæontology of Victoria."

In conclusion, I may say that Graptolites are amongst the most difficult of all forms to identify, and one has to be very familiar with a bed to identify any of the forms at sight. The differences between species, though constant, are often so minute that it seems at times almost impossible to separate them. The detailed descriptions must be taken word by word and carefully worked out. As shown by Lapworth's paper on distribution, there is perhaps no group that has suffered more by the publication of carelessly identified species than this one, and even here in Victoria mistakes have been made by observers that have been quoted to our confusion by other workers in Europe; so I shall conclude by hoping that no one will at some future time have to quote the *Victorian Naturalist* in order to show that some species has been there mentioned as occurring at some spot where it could not possibly have been found.—T. S. Hall, Melbourne University.

NOTES.

The Preservation of Indigenous Animals.—The matter of the preservation of the native fauna and flora has now become a pressing difficulty in many parts of the world, and if steps are not soon taken by Governments or other authorities to check the destruction which is taking place, the list, of animals especially which have become extinct since the beginning of this century, will in the near future be found to include many of the finest animals now inhabiting the earth. Of course the extension of civilization is primarily the cause of the disappearance of many animals, but the "big game hunter" is responsible for great destruction, especially in South Africa and America, while the exigencies of trade and fashion have also contributed largely

towards the same result. So serious has the matter become in South Africa that it is proposed to form an association to acquire a tract of country of about 150 square miles, and enclose it with a strong fence, in order to preserve small herds of some thirty-five or forty distinct species of animals which are threatened with early extinction—and when the list includes such beautiful creatures as the giraffe, zebra (the quagga is already said to be an animal of the past), eland, gnu, and several antelopes, it will be seen that our natural histories may soon be robbed of some of their most interesting features. It is thought that the undertaking would not be surrounded with much difficulty, and that in the course of a few years some revenue might be derived by the sale of surplus stock to Zoological Gardens. To show that such a project is feasible a recent article in the *Forest and Stream* is quoted in the *Zoologist* for June, 1894, which describes the Corbin Game Park in New Hampshire, U.S.A. The idea arose through Mr. Corbin, a wealthy railroad man, having been presented with a few young deer, which were turned out on his country seat at Long Island, and did well. Then noticing frequent reports of the rapid extermination of the buffalo in the Western States, the thought of endeavouring to perpetuate the species entered the minds of the Corbins (father and son), and gradually, as elk (Wapiti), moose and antelopes were added to the list, it became necessary to look for a larger and more natural home for the animals. Accordingly a tract of country containing 22,000 acres on the foot-hills of the White Mountains was secured, which was enclosed with a barbed wire fence about eight feet high, costing nearly £15,000. Here a start was made with twenty-two buffalo, sixty elk, seventy deer, six cariboo, and a dozen moose, and in a few years in most cases the animals have multiplied considerably, and in future years it may be necessary to thin out some of the denizens of the park. The enclosure contains two lakes of 20 and 30 acres each and 100 miles of streams, so that variety of country is not lacking. The Messrs. Corbin are so pleased at the results of this experiment that they are constructing, in a smaller park at Manhattan Beach, a large pond, which will be in connection with the ocean, to be stocked with seals from Newfoundland, and sea-lions from California.

The success of this experiment shows that two or three such parks should be created in different latitudes in Australia, ere its unique fauna becomes a thing of the past, as it certainly will do at no distant date unless such steps are taken. In Victoria the most suitable tract (the Dandenong Ranges) has been lost for such a purpose, but could not a portion of the Otway Forest supply its place, or even the proposed National Park at Wilson's Promontory, though the latter seems to be rather destitute of the forest protection necesssry for such a purpose.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part X.

CONOSARA. Meyr.

MICTODOCA. Meyr.

*319. M. toxeuta, Meyr. (Proc. Linn. Soc. N.S.W., 661, 1891).

I have a specimen, doubtfully referable to this species, from Gisborne.

CHLENIAS. Gn.

320. C. gonosema, Lower (Tr. Roy. Soc. S.A., 162, 1893).
Toorak.

321. C. pachymela, Lower (*loc. cit.*, 162).
Oakleigh.

322. C. arietaria, Gn., x., 239; *Chemerina cuneifera*, Walk., 1,155; *Ciampa defixella*, *ib.*, Cr., 180; *Chlenias crambaria*, pl. cxxxiii., 12; *C. arietaria*, Meyr., Proc. Linn. Soc. N.S.W., 663, 1891; *Hypata moderatella*, Walk., Char. Und. Lep., p. 82, 1869).
Gisborne, Melbourne, &c.

*322a. C. ombrophora, Lower (Tr. Roy. Soc. S.A., 1894, pt. i.)
Melbourne.

323. C. umbraticaria, Gn. (x., 240; Meyr., Proc. Linn. Soc. N.S.W., 665, 1891).
Melbourne, Gisborne.

324. C. banksiaria, Le Guillou (Rev. Zool., 1841, 247; Gn., x., 239; *C. auctaria*, *ib.*, pl. xiv., 1; *C. indecisata*, Walk., 1,153; *C. Banksiaria*, Meyr., Proc. Linn. Soc. N.S.W., 664, 1891).
South Melbourne, Mount Macedon.

325. C. seminigra, Ros. (Ann. Mag. N. H., 1885, 430; Meyr., Proc. Linn. Soc. N.S.W., 666, 1891).
Warragul.

326. C. zonæa, Meyr. (Proc. Linn. Soc. N.S.W., 665, 1891.)
Melbourne.

*327. C. rhyncophora, Lower (Tr. Roy. Soc. S.A., 163, 1893).
Melbourne.

SMYRIODES Gn.

*328. S. APLECTARIA, Gn. (ix., 223, pl. xx., 1; *Nisista notodontaria*, Walk., 294; *Vunga delineata*, *ib.*, Supp., 453; *Passa pygæroides*, Walk., Char. Undesc. Lep., 1869; *Smyriodes aplectaria*, Meyr., Proc. Linn. Soc. N.S.W., 667, 1891).
Melbourne, Oakleigh.

*328A. S. CARBURARIA, Gn. (*Chlenias carburaria*, Gn., x., 238; Meyr., Proc. Linn. Soc. N.S.W., 666, 1891; *Smyriodes carburaria*, Lower, Tr. Roy. Soc. S.A., p. 164, 1893).

GASTRINA. Gn.

STIBAROMA. Meyr.

329. S. MELANOTOXA, Meyr. (Proc. Linn. Soc. N.S.W., 669, 1891).
Gisborne, Melbourne, Wimmera District.

330. PLAGIOSEMA, Lower (Tr. Roy. Soc. S.A., ii., 1893).
Gisborne.

*330A. S. TRIGRAMMA, Lower (*loc. cit.*, p. 9, 1892).
Melbourne.

DRYMOPTILA. Meyr.

PARALÆA. Meyr.

NEOTERISTIS. Meyr.

MOCHLOTONA. Meyr.

331. M. PHASMATIAS, Meyr. (Proc. Linn. Soc. N.S.W., 673, 1891).
Warragul.

NOCTUINA.

If there is any group of Lepidoptera in a state of confusion it is the one under review. I have given a great deal of my leisure time in endeavouring to elucidate some of the knotty points pertaining to the different species. The results are not encouraging. The further one goes into the subject the more perplexing becomes the task. The members of the group, on the whole, are not so variable as one would imagine—that is, judging by the synonymy—but the trouble lies in having one species formed into half a dozen different genera and almost as many families. It is very annoying to find female specimens of *Agrotis*, for instance, described as *Mamestra*, *Xylina*, *Hadena*, or half a dozen other genera. It shows a want of systematic definition. It appears to

me that there have been altogether too many genera made, and in some instances on the most trivial grounds; and as for families, their name is legion. In some instances the species of one have been made to form no less than eighteen (18) distinct genera (*vide* Meyrick, Trans. New Zealand Inst., p. 3, 1886). This in itself is startling enough, but when one finds species of *Agrotis*, *Mamestra*, &c., referred to distinct families, the work of an entomologist, situated as we are in Australia, becomes very difficult. It seems in the past to have been considered the correct (?) thing to form a family for every ten or twelve genera. This has retarded more than helped students, and makes the whole subject vexatious. I thoroughly coincide with Meyrick's opinion, *i.e.*:—"No genus, family, or higher group is tenable unless *distinctly separable* (the italics are mine) from all others by points of structure, which, whether singly or in conjunction, are capable of accurate definition" (Trans. Ent. Soc. Lond., p. 430, 1890). Such families as *Orthosidæ*, *Agrotidæ*, &c., are useless and of no scientific value, and although hardly willing to recognize only two (2) families, as Mr. Meyrick suggests, it might after all be more practical. Meyrick's idea is, I believe, to form the group into two families, viz.:—*Noctuidæ* (hind wings with vein 5 imperfect, parallel to 4); and *Plusiadæ* (hind wings with vein 5 well developed, approximated to 4 towards base). Certainly very simple, easily discernible, and seemingly natural; but I would, however, have preferred also the *Orphideridæ* and *Hypenidæ*. Both these families have—that is, so far as the Australian forms are concerned—curious and apparently well-marked characters in the palpi which make them easy of recognition. I merely throw out the suggestion for what it is worth. It matters little, however, whether we have one large section—*i.e.*, *Noctuina*—or fifty different families in the arrangement of the whole group, but we want something workable. The arrangement here given, although imperfect, is that adopted by myself, and I hope will fulfil all requirements for the present. Every author consulted has a different method, or else uses different genera for the same species, which makes a good arrangement impossible: in consequence of this no particular author is followed. Mr. Henry Tryon, of Brisbane, has kindly placed his notes at my disposal, for which I here tender my thanks; and Mr. Butler's recent papers on the synonymy of the group have helped me not a little. The present list, though imperfect, is intended as a nucleus of something better to follow. I am busy preparing a catalogue of the *whole* of the Australian Heterocera, which I hope will be more perfect in detail than the present effort. I have purposely omitted several of the reputed Australian genera; there are, however, sufficient enumerated to make the arranging of any omitted genera an easy matter.

PROMETOPUS. Gn.

332. P. INASSUETA, Gn. (Noct., i., p. 38, No. 42, 1852); *Bryophila dorsivaria*, Walk. (Lep. Het., 15, p. 1,648, 1858).
Melbourne.

LEUCANIA. Ochs.

333. L. ADJUNCTA, Walk. (Lep. Het., p. 25, 1869).
Melbourne, Sale.

This species is very similar, if not identical, with *linearis* (Lucas).

334. L. UNIPUNCTA, Hw. (Lep. Britt., p. 174, No. 37; *L. extranea*; Gn., Noct., v., pp. 77, 78, 104).
Melbourne, Gisborne, &c.

334A. L. EXARANS, Lucas.
Williamstown.

335. L. CILIATA, Walk. (Lep., Het., ix., p. 110, No. 77, 1856; *Tæniocampa assimilis*, Walk., *loc. cit.*, xv., 1,708, 1858; *Leucania curta*, Walk., *loc. cit.*, Supp. ii., p. 627, 1865; *Sesamia ciliata*, Butl., Tr. Ent. Soc. Lond., p. 664, 1890).
Gisborne, Dandenong, Melbourne.

336. L. STENOGRAPHA, Lower (MSS.)
Gisborne, Oakleigh.

CHARICLEA.

HELIOTHIS. Tr.

337. H. ARMIGERA, Hb. (*Noctua armigera*, Hb., Samm. Von. Eur., iii., 230, 6; *Heliothis armigera*, Meyr., Tr. N.Z. Inst., 1886; *H. conferta*, Walk., Noct., 690).
Melbourne, &c., &c.

338. H. LEUCATMA, Meyr. (MSS.)
Gisborne, Melbourne, Studley Park.

CANTHYLIDIA. Butl.

XANTHODES. Gn.

LEOCYMA. Gn. (?)

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th September, 1894. The president, Mr. H. T. Tisdall, F.L.S., occupied the chair, and some 70 members and visitors were present.

REPORTS.

Reports of the excursion to Cheltenham on Saturday, 18th August, were received from the co-leaders, pond-life being dealt with by Mr. J. Shephard, and botany by Mr. C. French, jun.

CORRESPONDENCE.

The hon. secretary read a communication from Baron von Mueller, K.C.M.G., acknowledging the congratulatory resolution passed at the last meeting of the Club.

A letter was read from Mr. C. C. Brittlebank, of Myrniong, detailing his experience of the Magpie as a vegetarian. Over 400 birds were counted on a 20-acre field, and some that were shot contained as many as 80 grains of wheat. In harvest time, however, they destroy immense numbers of larvæ, and, taking one thing with another, he considered it as well to protect them.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. W. J. O'Neill and O. A. Sayce were duly elected members of the Club.

PAPER.

By Mr. W. Stickland, entitled "The Rotifer in Melbourne."

In a chatty way the author described the experiences of a microscopist in procuring Rotifers, or Wheel Animalcules, in the pond in the Treasury Gardens, and the results of their examination under the microscope in the evening at home. Full particulars of the structure and habits of a large number of species were given, and the value of the paper was much enhanced by excellent drawings of those described.

Some discussion followed, Mr. J. Shephard remarking that he felt sure the paper represented many such late sittings as the one so pleasantly described by Mr. Stickland.

NATURAL HISTORY NOTES.

Dr. A. Morrison read a note describing several new Micro-Fungi, and exhibited specimens of same.

Mr. A. H. Westley contributed a cutting which described as a strange animal a shelless mollusc from Queensland, belonging to the genus Hexabranchus.

Mr. R. Hall read a field note on the ornithology of the Box Hill district.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening :—By the Agricultural Department (Entomological Branch).—Rare bird from Dandenong, Minute Bittern, *Ardetta minuta*, presented by Dr. Moore. By Mr. C. French, F.L.S.—Australian timber-feeding moths, *Charagia Ramsayi* (male and female), *C. daphnandræ* (males and females), *Rhytia Hypermnestra* (new for Australia), and *Glycodes cosmarcha* (male and female) ; also, Australian beetles—*Stigmodera Carpentariæ* (new sp.), *Stigmodera* (new sp. from West Australia), *S. Frenchi* (new sp.) *Chariotheca Besti* (new sp.), *Platyphanes superbus* (new sp.), *Calodema Wallacei* (new for Australia), *C. regalis*, *Cyphogastra Macfarlanei* (new for Australia), *Typhocesis* (new sp.) ; also, rare Victorian Longicorn, *Bimia femoralis*, and Buprestis, *Astræus navarchis*, both reared from timber by Mr. H. Giles of Nar-Nar-Goon. Exotic Lepidoptera—*Urania rhipheus* (Madagascar), *U. Sloanus* (W. Indies), *U. leilus* (W. Indies), and *U. fulgens* (U.S. of Columbia). By Mr. C. French, jun.—Eggs of the following Australian birds, viz. :—Red-backed Kingfisher, Cinnamon-breasted Kingfisher, Orange-fronted Ephthianura, Australian Shoveller, Allied Kite, Grey Falcon, Jardine's Harrier, Winking Owl ; also, the very rare egg of the Princess of Wales Parrakeet, from Central Australia ; and a form of the orchid *Pterostylis cucullata*, from the Dandenong Ranges. By Mr. H. Gundersen.—Whalebone obtained during the cruise of the whaler *Antarctic*. By Mr. G. A. Keartland.—Skins of the Princess of Wales Parrakeet, *Polytelis Alexandræ*; Western Black Cockatoo, *Calyptorhynchus Banksii* ; White-bellied Bronzewing Pigeon, *Lophophaps leucogaster* ; Painted Finch, *Emblema picta* ; Red-lored Pardalote, *Pardalotus rubricatus* ; Crested Bronzewing Pigeon, *Ocophaps lophotes* ; Port Lincoln Parrot, *Platycercus zonarius* ; also, native shield, spears, and womera or thrower, from Central Australia. By Mr. A. E. Kitson.—Vesicular basalt from Lancefield Junction; Dolerite from Malmsbury ; Diorite from Mt. William, Lancefield ; Limonitic Conglomerate from Romsey ; Siliceous Nodule from Balmoral ; common Opal from Essendon ; Kaolin from Ringwood ; auriferous Stibnite, Cervantite, and Limonite from Ringwood ; also native axe from River Murray. By Dr. A. Morrison — New species of Micro-Fungi. By Baron von Mueller. — Plants collected by Sir W. Macgregor in New Guinea, viz. :—Carpodetus, Anthobolus, and Patersonia, genera new to New Guinea ; a second Coprosma, a third Clematis with very small flowers, *Rhynchosia Cunninghami* (not before found in New Guinea) ; also, a giant moss, *Dawsonia superba*, var. *Papuana*. By Mr. G. J. Page.—Slide of fossil Foraminifera from Williamstown, containing 80 forms. By Mr. F. Spry.—British

Butterflies, family Lycænidæ, or Blues. By Mr. A. H. Westley. —Shell, genus *Cypræa*, from Ceylon.

After the usual conversazione the meeting terminated.

EVIDENCE OF THE ANTIQUITY OF MAN IN VICTORIA.

By W. H. Ferguson.

(*Read before Field Naturalists' Club of Victoria, 9th July, 1894.*)

In parts of the Hopkins River valley, near Wickliffe, two distinct terraces exist, and as it is claimed that evidences of the valley having been occupied by man during pre-historic times can be obtained from both these terraces, a description of them may be of interest. They are composed of sand and sandy loam deposited by water. The Silurian rocks are visible in the bed of the creek, and the Newer Volcanic Basalt forms an escarpment on the eastern bank. Formerly the older terrace probably filled the valley from bank to bank, and the river flowed at a slightly higher level than it does at present. The lowering of the river may be accounted for by the stream having cut through an outcrop of Silurian rock lower down, and thus drained a portion of the valley that in flood-time would resemble a lake, and through which the river flowed. Relics of man have been found in this terrace at a depth of two feet. To account for these relics it is necessary to suppose that, when the water of the stream was low, men, presumably aborigines, camped on the river flats, made fires, manufactured weapons and implements, lived and died on, and perhaps were buried in, the soil of the flats, and that during floods the stream brought down sand and mud, and deposited it over the flats, thus covering over the relics of the blacks. In time, as the river cut its way deeper into the rock, the flood waters no longer spread over the upper terrace, but wore away part of it nearest to the bed of the present stream, and the remaining portion is now left on the west side of the river. A new flat was formed, to which in flood-time fresh soil is added. From this upper terrace, from the surface down to a depth of two feet, which was the deepest excavation noted, siliceous and other stones were collected, also pebbles of white quartz, in part waterworn and part angular, indicating that flakes had been struck from them, and sharp flakes of quartz, quartzite, flint, and common opal. From the lower terrace hatchets in the rough of porphyry and greenstone were obtained, together with chips of stone and shells of the freshwater mussel *Unio* (sp.) Pieces of porphyry were common; these had been carried from a distance for the purpose of forming hatchets from them. Traces of "ovens" were common in this terrace. About two miles below Wickliffe, in a sand deposit just below the table land,

there were collected several "mills" of basalt and stones of basalt, greenstone, and porphyry, and chips of porphyry, quartz, and opal, &c. It is not claimed that this sandy deposit is of any great age; it may be, and certainly is if it was laid down by the river, but it may have been blown from the sand of the table land, or washed down by rains. The mills found here are formed from large pieces of basalt, hollowed out sometimes on both sides, at others only on one. The stones used in the manufacture of hatchets were greenstone and porphyry. This sandy deposit is most interesting. Many rabbit burrows have been dug out, and excavations two or three feet deep occur all over it, and at most of these holes stones and a chip or two may be picked up. Several mills were found, and some were left by the writer as being too heavy to carry.

The most interesting site at which implements were collected was in the valley of the Wannon, about one mile north of Glenthompson township. The wind has there blown a hole in a sandbank, which is partly a terrace of the Wannon and partly a windblown formation. The hole is about 40 yards across; the light particles of sand have been blown away, and the fragments of stone have just sunk and been concentrated on the bottom of the hole. In a short time there were gathered from this hole 280 pieces of stone, including flakes and chips of white quartz, quartzite, fossiliferous flint (probably from Portland), common opal from Mount Stavely Range, basalt, dense black basalt resembling a rock at Malmsbury, obsidian, jasper, metamorphic schist, porphyry, Grampian sandstone, and a siliceous breccia resembling a rock at Heathcote. The late Mr. B. Smythe, in his work "The Aborigines of Victoria," describes similar flakes of dense basalt and other stone as being used for knives and spear barbs; these chips may have been used for forming spears, skinning animals, for awls, and perhaps for opening mussels. The other relics gathered at this spot were—cutting edge of a hatchet, well polished, of porphyry; portion of hatchet in the rough, of a metamorphic rock; two sharpening stones of Grampian sandstone; fragment of basalt, indicating that the perfect stone had had a hole drilled through it; several pieces of bone, much altered; fragments of mussel shells; and a piece of white pipeclay, which may have been used as a pigment. As the formation has been disturbed, it is rather difficult to say of what age are the implements gathered; they represent the stones that were in the deposit which was laid down under the water, those that may have been covered by blown sand, and those that were just lying on the surface. The lower part of the formation is apparently a portion of a terrace of the Wannon, but as the surrounding district was not examined no estimate of its relation to the terrace formation of the Hopkins could be formed.

Hundreds of chips and flakes still lie on the bottom of the hole, and it would be of great interest to have the banks of the hole, some four feet deep, scraped down, and to sink in the bottom of the hole in order to ascertain to what depth the relics of man descend.

It would be to the interest of science if members of the club, when in the field, would look for chips and flakes of siliceous and tough rocks ; a single hatchet could not have been formed unless scores of chips had been struck off the stone, and a "knife" was absolutely necessary to an aborigine, and one might certainly expect, if man had formerly occupied a locality, to find traces of his presence by chips and flakes of tough igneous rocks or sharp siliceous stones. As these chips do not at first sight appear to differ much from small stones that may have assumed their present forms without the direct intervention of man, it may be as well to point out on what evidence they may be regarded as indicating that they are of human production. Sharp-edged, thin chips of stone are sometimes found in superficial deposits of fine sand, clay, or sandy loam. How are they to be accounted for in such a position ? The current that carried mud or very fine sand could not move small stones, and stones when rolled any distance lose their sharp angles. Without resorting to theories of floating ice or uprooted trees, it is better to regard the stones as being relics of man, and to look for further evidence. Quartz pebbles are often found, some all waterworn, some part waterworn and part angular, showing that flakes had been struck from them. Burnt stones are common—any stones of the immediate locality—some angular, some waterworn, but, with the exception of basalt, all so brittle that they will shatter with a tap of the hammer. These stones have been subjected to the action of fire in the "ovens" of the blacks. Evidence may be gathered from the chips individually and collectively. Individually if the flake shows signs of having been chipped to a rude form, as an oval, or to a more oblong form of "knife," or to a triangular spear point, or if a cutting edge has been worked up on the flake by numerous minute chips having been struck from it, or if the chip clearly shows the bulb of percussion, then it may be put in as evidence. Collect as many chips as possible from a formation, ascertain the variety of rock, note if the scraps of stone differ from the rocks of the immediate locality or of the watershed which is being searched. Perhaps the valley where you collect the flakes may be a basaltic one, and the chips that you gather may be all of flint, jasper, quartz, quartzite, porphyry, &c., then the evidence from the chips, considered collectively, most clearly indicates that some of the few scraps of stone that you hold in your hand were once the prized possessions of some dusky warrior, and they may have been undisturbed for thousands

of years. When searching for evidence of man from a formation, the least chip of sharp angular stone should be preserved, as though the stone may be a mere waste flake struck off from an implement in course of construction, still someone may be able to recognize it as a portion of a rock that does not occur *in situ* for perhaps 50 miles from where picked up, and it can thus be shown to have been carried.

In conclusion, I should like to suggest to members that, should any of them care to collect evidence of the antiquity of man in Victoria, they will find in the valley of the Hopkins near Wickcliffe, and that of the Wannon near Glenthompson, splendid opportunities for their investigations.

NEW VICTORIAN MICRO-FUNGI.

By Dr. A. Morrison.

Uromyces orchidearum, C. and M., Grev., xvi., 74; Cooke, Handb., p. 332; Sacc., Syll., vii., 580.

Pseudoperidia hypophyllous, scattered, sometimes forming pale reddish brown orbicular spots, immersed, at first elliptical in section, margin split into unequal whitish lobes and recurved after rupture; accidiospores orange yellow, ovate to subglobose, and more or less compressed, verruculose, largest 18–23m. x 13–18m. Sori mostly epiphyllous, discrete or confluent, bullate, the pale brown cuticle at length split, sometimes also hypophyllous. Uredospores intermixed with teleutospores in sori, yellowish-brown, obovate or elliptical, echinulate, with hyaline pedicels, largest 23–32m. x 16–23m. Teleutospores deep brown, elliptical obovate or subglobose, with broad beak formed by thickened epispore, largest 30–43m. x 17–23m.; pedicels hyaline, about twice as long as spores, tapering downwards from summit, which may be 9m. or less in breadth.

On leaves of *Chiloglottis diphylla*, R. Br., Oakleigh, July.

Teleutospores only hitherto described.

Puccinia coprosmatis, n. sp.

Sori hypophyllous, seldom on upper surface of leaves, prominent, deep brown (castaneus, Sacc.), sometimes with thin paler primrose covering, becoming surrounded with ring of discoloured leaf tissue, which may extend through to upper surface; the smallest spherical 66m. in diameter, the largest 2mm., lobulated evidently from coalescence of several, bordered by remains of epidermal covering or naked, sometimes deforming the leaves, of which those at the tips of the branchlets are most affected. Spermogones numerous, clustered, immersed among teleutospores or separate, while immature mammillary or subglobose, with conoid apiculus, brown-black from network of black lines on outer surface, spermatia of brownish tinge, fusiform, variable in length and in thickness. Teleutospores compact, brown, the two

cells about equal and more or less ovate, tapering to opposite ends of spore with slight external constriction between them, apex bluntly pointed by thickened epispore or rounded; largest 33–43m. x 15–20m.; pedicels hyaline, long, about 6m. in thickness.

On leaves of *Coprosma Billardieri*, F. v. M., Kew, October; Dandenong, February.

In the later gathered specimens, from Dandenong, the cells of the teleutospores are empty, and the sori and surrounding tissues of the leaf pervaded by coarse dark-coloured promycelial filaments, partially septate, and bearing sporidia.

(To be continued.)

NOTES.

ORCHID—PTEROSTYLIS CUCULLATA—At the September meeting of the Club a freshly collected specimen of a Pterostylis from the Dandenong Ranges was exhibited by Mr. C. French, jun., which I regard as a form of *Pterostylis cucullata*, R. Br. The specimen had a very elongated stem, the lower portion leafless except bearing two minute rudimentary leaves, while within the embracing floral bract a very short and narrow accessory bract was contained, in the manner of that occurring in *Caladenia Menziesii* and *C. Nortoni*. Many years ago Mr. C. French, F.L.S., found *P. cucullata* at Cheltenham in peaty Melaleuca scrub drawn up to five feet high, so that *P. Babtistii*, Fitzgerald (Hooker's Bot. Mag., 6,351) should probably be regarded as a gigantic form of *P. cucullata*.—F. VON MUELLER.

BIRDS OF BOX HILL DISTRICT.—Some brief notes as to the arrival of nomadic birds, and the nesting dates of others, at Box Hill this season, may be of interest to members for comparison with their own observations. The earliest young flying birds observed were the Mountain Thrush, *Geocichla lunulata*, on the 26th of August, and the *Ephthianura albifrons* on the 28th; a fully fledged specimen of the latter I obtained by accidentally placing my foot on it while in search of the nest. The young of the White-backed Crow Shrike (Magpie), *Gymnorhina leuconota*, were seen flying last week, and a nest of the Yellow-rumped Geobasileus, *G. chryssorhœa*, containing two young partly fledged, on the 31st of August. Many nests of Yellow-breasted Robins, *Eopsaltria australis*, one having two young, were noted on 8th September, and a nest of the Scarlet-breasted Robin, *Petrœca Leggii*, was obtained at the close of August. On Saturday last (8th September) I was fortunate in securing a male Rose-breasted Robin, *Erythrodryas rosea*. On 18th August both Pallid and Bronze Cuckoos were visible to residents; on the crown of the former I was surprised to notice a group of white feathers, the reason for which some of our members may

be able to explain. I am inclined to think the Bronze Cuckoo was keeping late hours on Thursday evening last (6th September), for at 10 p.m. I heard what I considered to be a Bronze Cuckoo, with a melancholy night-call appearing to differ from the diurnal call in being stronger, and concluding with a jerky note that I have not yet heard during daylight in this district. Among hard-billed arrivals of the middle of August was the Goldfinch (introduced), which is now regularly seen during early morning in a certain market garden feeding in a flock of at least 25 on the groundsel, and, owing to their beautiful plumage, offering good encouragement to bird-snarers, half-a-crown each being obtainable for living specimens. On being placed in an aviary with canaries, however, their distinctive markings are soon lost by inter-breeding. Although change of plumage hardly constitutes an early arrival, we almost see new birds in the second plumage of the Superb Warbler (Blue Wren) *Malurus cyaneus*, as last week I saw three or four in process of transformation from modest grey to the well-known beautiful blue colour of the head, back, and chest, and although there are apparently no nests yet available, some have paired and isolated themselves from the little flocks of from six to twelve in which they are usually seen.—R. HALL. Box Hill, 10th September, 1894.

NATIONAL PARKS.—We are pleased to note that the Government of Western Australia has decided to reserve a large tract of public land as a National Park, on the suggestion of Mr. Bernard H. Woodward, Curator of the Government Museum, Perth. The site chosen contains 160,000 acres, and is situated on the Darling Range, between the Albany and Bunbury roads, between Bannister and Pinjarrah, within a reasonable distance of Perth. The land is very picturesque, rugged, with serrated peaks, well wooded and well watered, and at present contains kangaroo and emu.—*Natural Science*, June, 1894.

SURREY HILLS FIELD CLUB.—The second annual meeting of this society was held on 10th July, 1894, when a very satisfactory report was presented. During the evening the Rev. W. Fielder delivered a brief address on natural history topics, and several members of the Field Naturalists' Club of Victoria forwarded exhibits in order to encourage their young friends.

EDIBLE FUNGI.—An excellently illustrated article, entitled "A Few Edible Toadstools and Mushrooms," by Mr. W. Hamilton Gibson, appeared in *Harper's Magazine* for August, 1894, and as many of the genera mentioned are found in Victoria the information given should be of value to Victorian mycologists.

WHITE ANTS.—Mr. W. W. Froggatt, of the Technological Museum, Sydney, is anxious to obtain specimens of the Termitidæ of Australia, with the view of describing them, and will furnish particulars of his requirements to collectors on application.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part XI.

NOCTUINA *(continued).*

ACONTIA. Ochs.

ERASTRIA. Ochs.

339. E. amorpha, Butl. (*Acontia amorpha*, Butl., Tr. Ent. Soc. Lond., 1886).
Melbourne, Kewell.

340. E. ritsemæ, Snell.
Melbourne.

OZARBA. Walk.

CALLIPYRIS. Meyr.

{ EROMENE. Hb.
{ THALPOCHARES. Ld.

Mr. Meyrick points out (Tr. Ent. Soc. Lond., p. 481, 1890) that Hübner used the name *Eromene* for a genus of *Noctua*, and also for a genus of *Pyrales*. The name *Eromene*, therefore, supersedes *Thalpochares*, while the *Pyrales* under the name of *Eromene* are merged into *Euchromius* (Gn.)

341. E. rosata, Butl. (?)
Melbourne.

342. E. pusilla, Butl. (Tr. Ent. Soc. Lond., p. 404, 1886).
Gisborne, Ascot Vale, &c.

343. E. dubia, Butl. (*Matœmera dubia*, Butl., Tr. Ent. Soc. Lond., p. 418, 1886).

344. E. coccophaga, Meyr. (Proc. Linn. Soc. N.S.W., p. 1,037, 1887).
Gisborne, Gippsland, Kewell.

RIVULA. Gn.

ANTHOPHILA. Ochs.

BERRESA. Walk.

PERIGEA. Gn.

345. P. octo, Gn. (Noct., i., p. 233, No. 377, 1852; *Poaphila stricta*, Walk., Het. Lep., xiv., p. 1,476, No. 21, 1857; *Ilattia cephusalis*, *ib.*, *loc. cit.*, xvi., p. 209, 1858; *Amyna undulifascia*, Butl., Ann. Mag. N. H., ser. 4, vol. xvi., p. 403, 1875; *Ilattia apicalis*, Moore, Ind. Lep. Atk., ii., p. 112, 1882; *Perigea supplex*, Swinhoe, P. L. S., 1885, p. 452; *Ilattia octo*, Butl., Tr. Ent. Soc. Lond., p. 690, 1890).
Oakleigh.

The variety *axis* (Gn). I have not yet seen from Australia.

BYTURNA.

346. B. DIGRAMMA, Walk.

347. B. INOSTENTATA, Walk. (*Panagra inostentata*, Walk., Geom., 1,012).

I place this here provisionally. It is generally known amongst Australian collectors as *Aspilates inostentata*.

EARIAS. H. S.

This genus is referred by some writers to the Bombycina.

348. E. CHLORODES, Meyr. (MSS.)

349. E. FABIA, Stoll.

350. E. INSULANA, Bdv.

RADINOGOES. Butl.

351. R. TENUIS, Butl. (Tr. Ent. Soc. Lond., p. 394, pl. ix., fig. 8, 1886).
Melbourne, Apsley, Castlemaine, Gisborne.

CARADRINA. Ochs.

352. C. CONSOCIA, Walk. (Noct. 299; *Mamestra confundens*, Walk., Char. Und. Lep., p. 69, 1869).
Melbourne, Gisborne, &c.

This species is not to be confounded with *Euplexia confundens* (Walk., Lep. Het., xi., p. 544, No. 3, 1857).

ORTHOSIA. Gn.

353. O. CAPULARIS, Gn. (*Agrotis capularis*, Gn., Noct., i., p. 271, 437 (?); *Hadena congregata*, Walk., Lep. Het., xi., 598, 1857).
Gisborne, Melbourne, &c.

354. O. BISTRIGULA, Walk. (*Hadena bistrigula*, Walk., No. xi., 599).
Melbourne, Windsor, Kewell, Gisborne.

355. O. ATRA, Gn. (female, *Agrotis atra*, Gn., Noct., i., 272, 1852; male, *A. hydrœciodes*, Gn., *loc. cit.*; *Graphiphora reclusa*, Walk., Lep. Het., x., p. 403; *G. instipata*, *ib.*, part, *loc. cit.*, 404; female variety, *Agrotis testaceicollis*, Gn., Noct., i., 273, 1852; *Mamestra lucifera*, Walk., Lep. Het., Supp. ii., p. 668, 1865).
Gisborne, Kewell, Melbourne.

356. O. CRENMODES, Lower (Tr. Roy. Soc. S.A., p. 152, 1893).
Kewell.

357. O. MESOMBRA, Lower (*loc. cit.*, p. 153, 1893).
Oakleigh.

358. O. TIBIATA, Gn. (*Agrotis tibiata*, Gn., Noct., i., 273, 439; Walk., Lep. Het., Noct., x., 350).
Gisborne.

359. O. COMPTA, Walk. (*Graphiphora compta*, Walk., Noct., x., 404; *Anchocelis bicolor*, Walk., Char. Und. Lep., p. 70, 1869; *Orthosia deprivata*, Walk., *loc. cit.*, p. 71, 1869; *Orthosia elliptica*, Meyr., MSS.
Gisborne, Kewell, &c.

360. O. COSTALIS, Walk. (Char. Und. Lep., p. 69, 1869; *Agrotis antipoda*, Feld., Reis. Nov., pl. cx., fig. 21, 1874).

Noctua plecta (Gn.) has been confused with this species by some Victorian entomologists; *plecta*, so far as I know, has not yet been taken in Australia.

361. O. SPODIAS, Meyr. (MSS.)
Gisborne, Cheltenham, Melbourne.

362. O. SCYTHRASTIS, Meyr. (MSS.)
Melbourne, Gisborne, &c.

363. O. TORTISIGNA, Walk. (*Ochropleura tortisigna*, Walk., Lep. Het., Noct., No. 409; *Vitocris epiplecta*, Gn., Noct., x., p. 410).
Gisborne, Melbourne.

364. O. LUCASII, Butl. (*Miana Lucasii*, Butl., Ann. Mag. N. H. (5), ix., p. 89).
Gisborne, Kewell, Sandringham.

HADENA. Gn.

365. H. HOROLOGA, Meyr. (MSS.)
Gisborne, Melbourne.

366. H. ASPERA, Walk. (Noct., xi., 601; *Xylina provida*, Walk.; *Xylina canescens*, Walk.; *X. saxatilis*, Walk., Char. Und. Lep., p. 72, 1869).
Gisborne, Melbourne, &c.

DASYGASTER. Gn.

367. D. LEUCANOIDES, Gn. (Noct., i., p. 202, 320; Walk., Lep. Het., ix., p. 241).
Melbourne.

368. D. HOLLANDIÆ, Gn. (Sp. Gen. Noct., i., 201, 319; Walk., Lep. Het., ix., p. 241).
Melbourne, Gisborne.

369. D. MUNDOIDES, Lower (Tr. Roy. Soc. S.A., p. 152, 1893).
Melbourne.

MONOCRIAS. Meyr.

370. M. PELINOTA, Meyr. (MSS.)
Melbourne, Windsor.

AGROTIS. Tr.

371. A. MUNDA, Walk. (Noct., x., p. 348, 1856; *A. basinotata*, *ib.*, *loc. cit.*, xv., p. 1,686, 1858; *A. aneituma*, Walk., Supp., p. 701, 1865; *A. turbulenta*, *ib.*, *loc. cit.*, p. 703; *A. injuncta*, *ib.*, *loc. cit.*, p. 703).
Gisborne, Melbourne, &c.

372. A. INFUSA, Bdv. (Voy. *Astrolabe*, pt. i., 240; Walk., Noct., x., 350; (?) *Agrotis vastator*, Scott, Tr. Ent. Soc., N.S.W., ii.)
Gisborne, Oakleigh, &c.

This species I have had sent me under the name of *spina* (Gn.) and *vastator* (Scott). The latter name is, I believe, identical with *infusa*.

373. A. YPSILON, Rott. (*Noctua ypsilon*, Rott.; *Agrotis suffusa*, Hb.)
Melbourne, &c.

Agrotis saucia is said to have been taken in Victoria, and was exhibited at one of the F. N. meetings as such. The specimen, however, shown was, without doubt, *ypsilon*, hence my reason for omitting *saucia*.

374. A IGNOBILIS, Walk. (*Mamestra ignobilis*, Walk., Lep. Het., ix., 239, 1856; *Agrotis rubrilinea*, *ib.*, *loc. cit.*, x., 351, 1856; *A. recondita*, *ib.*, *loc. cit.*, No. 106; *A. dorsicinis*, *ib.*, *loc. cit.*, xv., 1,701, 1858; *Perigea albinasus*, *ib.*, *loc. cit.*, x., p. 276; *Hadena albipalpis*, *ib.*, *loc. cit.*, Supp. xxiii., pt. 3, 742; *Agrotis transversa*, *ib.*, Char. Und. Lep., p. 70, 1869; *A. Baueri*, Feld.)
Gisborne, Melbourne, &c.

375. A. BREVIUSCULA, Walk. (*Orthosia breviuscula*, Walk., Lep. Het., Supp. xxxiii., pt. 3, p. 716).
Melbourne, Gisborne, &c.

This may be a variety of above. It approaches very closely, but is a somewhat larger insect.

APAMEA. Ochs.

376. A. SPUMIGERA, Gn. (Noct., i., 212, 336; Walk., Noct., ix., 352).
Gisborne, Melbourne, Croydon, &c.

THE

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th October, 1894. Professor W. B. Spencer, M.A., a vice-president, occupied the chair, and some 70 members and visitors were present.

REPORTS.

A report of the excursion to Frankston was received from the leader, Mr. C. French, F.L.S., which recorded a very enjoyable trip.

MEETING FOR PRACTICAL WORK.

A meeting for practical work was held on 24th September, when a demonstration on "Amphioxus" was given by the Rev. W. Fielder, assisted by Mr. W. Mann, of the Biological School. The demonstration was illustrated by descriptive diagrams and mounted slides of the whole animal and sections of the same.

ELECTION OF MEMBERS.

On a ballot being taken, Miss A. Trickett was elected a member of the Club.

PAPER.

By Mr. G. A. Keartland, entitled "Ornithology in Central Australia."

In the author's absence this paper was read by the hon. secretary, and was a first instalment of a series of notes on the birds met with in Central Australia during the recent Horn scientific expedition, which Mr. Keartland accompanied as zoological collector. The paper dealt mainly with the eagles, hawks, owls, finches, pigeons, and parrots. Especial interest was attached to the description of the rare Princess of Wales Parrakeet, of which Mr. Keartland was fortunate in securing several specimens. In the discussion which followed, Professor Spencer paid a grateful tribute to the zeal and energy which Mr. Keartland displayed throughout the expedition.

EXHIBITION OF WILD FLOWERS.

Owing to the inclement weather, which rendered collecting almost impossible, the exhibition was not so large as usual. A splendid display was, however, made by Baron von Mueller, the

specimens being mostly from the country. At the invitation of the chairman, Baron von Mueller made some introductory remarks, after which the meeting was adjourned to inspect the exhibits.

EXHIBITION OF SPECIMENS.

The following is a list of the principal exhibits of the evening: —By Mr. A. Coles.—Pair of Eggs of New Holland Goshawk, *Astur cinereus*. By Mr. C. French, F.L S.—Beetles, comprising *Carenum habitans*, *C. optimum*, *C. Frenchii*, *C. pusillum*, *Eutoma viridicolor*, *E. Frenchii*, *Megacephala Frenchii*, all new to science; also, *M. Howitti*, *Carenum sumptuosum*, *C. Dameli*, and *Eutoma splendida*; also the following Lepidoptera:—Euplœa (five species), *Mynes Geoffroyi*, and *Ægeria chrysophanes*, from Queensland; *Morpho cypris* and *M. nestira*, from South America. By Mr. C. French, jun.—Eggs of the following Queensland birds, viz.:—Cat Bird, Spalding's Orthonyx, Superb Fruit Pigeon, Noisy Pitta, Little Green Pigeon, Sun Bird, White-tailed Kingfisher, Large-billed Sericornis, Flood Bird, Large-headed Robin, and Dusky Honeyeater. By Mr. G. E. Hill.—Three Tiger Snakes, *Hoplocephalus curtus*, two from Nar-Nar-Goon and one from Werribee. By Mr. A. E. Kitson.—Jasper from Buchan and Moreland; Siliceous Conglomerate from Buchan River; Nickel Ore from New Caledonia; Nephrite from New Zealand; Rose Quartz from Mount Hotham; piece of Indicator from Ballarat; and Selenite from Jan Juc. By Mr. Jas. Mitchell.—A large collection of cut and polished Agates from Brazil, Scotland, New Zealand, and Northern Territory; Jaspers and precious Opals from Queensland; Labradorite (Felspar) from Labrador; Crocidolite (Silica and Iron) from Orange River, South Africa; Bloodstone, Petrified Wood, and Petrified Bone from Cheltenham; Malachite (Green Carbonate of Copper) from Russia and South Australia; and Opalized Wood from Snowy River, Gippsland. By Dr. A. Morrison.—*Phylloglossum Drummondi*, Kunze, and *Polypompholyx tenella*, Lehmann, collected at Oakleigh, 8th October, 1894. By Mr. G. J. Page.—Slide of group of Diatoms from Oamaru, New Zealand; also, slide of Diatoms from Port Phillip Bay. By Mrs. Flatow.—Wild flowers from Sydney. By Mr. W. Scott.—Wild flowers from Sydney, including the Giant Spear-Lily, *Doryanthes excelsa*.

After the usual conversazione the meeting terminated.

COMPETITION FOR YOUNG COLLECTORS.—Owing to the limited number of competitors on former occasions, the Field Naturalists' Club has decided not to offer prizes to juniors during the current year.

EXHIBITION OF WILD FLOWERS.

THE exhibition of native flowers usually held in the spring by the Field Naturalists' Club of Victoria was not so extensive this year as usual, on account of the unpropitious weather experienced at the time (8th October). However, through the instrumentality of Baron von Mueller, K.C.M.G., there was a very fair display from several country correspondents. Amongst the specimens sent as particularly noteworthy may be recorded:—*Hibbertia acicularis*, var. *sessiliflora*, *Eriostemon obovalis*, *Helichrysum obcordatum*, *Pimelea stricta*, and several table bouquets, from Mr. G. Knight, J.P., Bendigo; *Bæckea diffusa*, *Grevillea aquifolium*, and *Pterostylis barbata*, from Mr. A. Purdie, Bendigo; *Acacia armata* (a form almost without prickles), *Grevillea ericifolium*, and *Helipterum incanum*, from Mr. F. L. Billinghurst, president of the Field Ramblers' Club, Castlemaine; *Dodonæa boronifolia*, *Daviesia ulicina*, var. *ruscifolia*, *Pultenæa mucronata*, and *Thryptomene ciliata*, from Miss Oke, Beechworth; *Boronia polygalifolia*, var. *anemonifolia*, *Correa speciosa* (red variety), *Styphelia*, sp., a rare small-leaved species of the section Leucopogon, *Thelymitra longifolia* (a variety with almost membranous flowers), *Pterostylis concinna* (not known from Gippsland previously), and *Caladenia Cairnsiana* (only once before observed in Victoria), from Miss May Wise and Miss Muriel Bennett, Sale, youthful disciples of Mr. Alex. Purdie; *Swainsona procumbens*, *Eucalyptus leucoxylon*, *Brachycome pachyptera* (the erect-growing form), *Calotis scabiosifolia* (with white rays), and *Helipterum Jessenii*, from Mr. Henry King, F.R.H.S., Echuca. Mr. T. S. Hart, M.A., exhibited a number of specimens from the Brighton district, and other exhibitors helped to make up an interesting display.

Special acknowledgment is due to Messrs. T. S. Hart, M.A., and C. French, jun., who kindly undertook the arranging, and largely also the naming, of the specimens.

It has been suggested that in future years the scope of these exhibitions might be extended by the admission of original coloured drawings of native flowers and plants, wax models, framed groups of dried native flowers, or other floral designs, showing the practical applicability of the native floral wealth; and, as on such occasions as these annual displays the public is freely invited to be present, a greater interest in our floral surroundings might be inspired, and a better knowledge of the indigenous flora gained.

THE ROTIFER IN MELBOURNE.

By W. Stickland.

(*Read before the Field Naturalists' Club of Victoria, 10th September*, 1894.)

We are to direct our attention this evening to a little inhabitant of the city which does not appear in the census papers, but nevertheless pursues the tenor of its way (whether even or perturbed) beneath the placid surface of a pond only a few minutes' walk from the General Post-Office.

At the outset it is perhaps only fair to myself to state that this somewhat desultory paper owes its origin to the stirring appeals (not, it must be confessed, unreasonable) made of late by our president and committee to the newer members for contributions to the Club's proceedings. Still, while making no claim to any sort of novelty, these notes may perhaps not be devoid of use, at least to some few of our members, and as the topic is one that rarely comes before us, we shall perhaps be excused for treating it at some length. There is an ever-recurring epoch in the life of the microscopist when, after two or three hours spent in fruitless search among the collections of water, long stored up in sundry jars, cups without handles, or other domestic relics, the conviction is borne in upon his soul that his microscopic live stock has run out, and must forthwith be replenished.

The question naturally arises, Where shall more be obtained? A long trip in the middle of the week is not to be thought of, and even the Botanical Gardens are out of reach. In this extremity we fall back upon our old resort—the pond in the Treasury Gardens. Lunch dispatched, bottle in pocket we wend our way up the street sacred to the Asclepiads of Melbourne, and down to the somewhat dirty-looking pool. Evading by an assumption of stolid indifference the prying eyes of that leisured class which haunts the lakelet's banks, we suddenly produce our little wide-mouthed bottle, pick a few scraps of weed, fill up with water, and beat a retreat.

In the evening let us suppose ourselves at the microscope, with well-filled lamp, ready for a long sitting. Small preparation is needed. We put a morsel or two of weed, with a drop of water, on a slip under a cover glass, and commence our examination. What objects are now likely to present themselves? A partial answer to this query is the purpose of our paper, and we shall mention only such as are procurable—not perhaps all at any one time—in the pond which we have named.

The first glance shows that our weed is clothed with Algæ of many sorts, mostly filamentous; some of their zoospores may be seen shooting about with aimless impetuosity. Diatoms, too,

some stalked, others moving, very deliberately indeed, are in the field, as well as pretty Desmids, Closterium, Pediastrum, or others. But none of these, however beautiful or interesting, concern us now. The more fascinating animal life is our object; and this is most abundantly represented by the Rotifers, or Wheel Animalcules. These almost inevitably attract our notice first, owing to their liveliness, immense variety of curious forms, and the elaborate structure disclosed by their very transparent bodies. Nor are the charms of colour wholly wanting. No small recommendation, too, is the fact that these interesting creatures can be effectually studied with quite modest means. An unpretentious little microscope, equipped with only two lenses, say an inch and a quarter inch (but both good), will suffice to carry us a long way in this pursuit. We had better, perhaps, add a condenser, lest we appear retrograde and bring criticism on our heads.

Our friend Mr. Shephard, about two years ago, described the structure and classification of the Rotifera. But it may be advisable to advert briefly to the former; the latter will appear, to some extent, as we go on.

First, then, we notice the head, with its highly characteristic appendages, the ciliary wreaths; and, in some cases, setæ, or stiff bristle-like attachments. These vary greatly in the different species, in many of which the cilia, by rapid successive movements, produce the well-known and no less wonderful illusion of revolving wheels—an illusion from which we cannot escape, though we look at it for the hundredth time. On the under side of the head is a somewhat V-shaped opening, the buccal orifice, which serves as a mouth, and leads by a funnel-like tube, guarded at the bottom by two tiny lips, to the mastax. This mastax is a loose muscular bag enclosing the two trophi. These trophi, or internal jaws, form a very special and conspicuous feature in Rotifers. They are complex in structure, consisting of three main portions, two called mallei, or hammers, and the third, between them, called the incus, or anvil. These elements, also, are subject to great modification. The function of the trophi is to grind up the food, and this operation can easily be seen constantly going on. From the mastax, a short tubular œsophagus leads to a sack-like stomach, followed by intestine and rectum. Cilia line the whole of this alimentary canal. Three sets of glands are distinguished. The so-called salivary glands are attached to the front of the mastax; the gastric glands to the front of the stomach; two foot glands secrete a sticky substance, which assists the Rotifer to adhere wherever it desires. A ganglion, or brain, with threads running to the eyes and antennæ, makes up the nervous system. The latter are the Rotifer's sense organs. The eyes are small spots,

usually red, one to four in number, situated on or connected with the brain, and are not to be seen in the adults of some species. The antennæ are slender tubes, each bearing a minute brush of very delicate setæ. They may be dorsal, ventral, or lateral. The movements and contortions of the Rotifer are effected by a muscular system of several longitudinal and transverse bands—the longitudinal, in some species, stretching from the corona to the toes. The lateral canals, slender tubes running—with many twists and turns—down each side of the body, and usually connected with a contractile vesicle, make up the vascular system. The vesicle—a bladder-like organ—may, in many species, easily be seen contracting and dilating. The precise function of the vascular system is not yet altogether beyond question. Attached to the lateral canals are some very curious little appendages—the vibratile tags. An incessant fluttering movement is maintained within them. Add to these a foot (sometimes, however, wanting) and toes (one, two, or three in number).

We have yet to mention the distinction of the sexes amongst the Rotifers. It must be observed that the vast majority of those we find are females. In these the ovary is very large, and may contain eggs in all stages of maturity. In some of the commonest genera the male animals are still quite unknown, so that their existence seems problematical. Rotifers produce three kinds of eggs. From the smallest and most rounded the male animals are hatched, and from larger and more oval eggs the females. The real nature and use of the third kind (the ephippial eggs) are perhaps scarcely fully understood at present. Many Rotifers deposit their eggs about the algæ. In such cases we frequently observe the developed young animals twisting and turning within the elastic covering of the egg, and exercising their cilia and trophi.

It may be worth while to note that the open spaces in the bodies of Rotifers are not empty, but contain a perivisceral fluid. It is this fluid which, impelled by muscular contractions into the head and foot, produces the extension of the animal—a process clearly seen in large Floscules. To appreciate rightly the fulness of organization in the Rotifera we must bear in mind that the largest of them are only about $\frac{1}{10}$ inch in length, while the smallest measure but $\frac{1}{500}$ inch.

The points of cardinal importance for identification of species are the front of the head, called the corona, with the attached ciliary wreath ; the eye spots and antennæ ; the trophi, of which seven typical forms are described, and the foot and toes, or their absence. With all these, however, allied species have often been confounded by highly expert observers. Should we trip occasionally, therefore, we shall not incur too much blame. The first of the four orders into which the Rotifera have been divided

includes all those which build a sort of house, more or less in the shape of a tube. They are classed as Rhizota (rooted). After once taking their place they never remove. The tube has a gelatinous sheath as its basis. These householders, which are all females, may be abundant on our weed. Yellowish-brown tubes dotted here and there announce the presence of *Melicerta ringens*, probably the first favourite amongst Rotifers, and almost too well known to need description. Many of the tubes may be empty, but presently we see slowly emerging from one a pair of long antennæ, and perhaps two tiny hooks ; a wrinkled mass follows, and soon discloses the elaborate and beautiful head of the animal. Four elegantly curved lobes are unfolded in shape like petals of a flower. Fringing their long and sinuous outline we see the principal wreath of strong cilia, suggesting by their unvarying movement, a running endless chain. There are probably few lovers of microscopic life who have not spent many hours in the contemplation of this striking spectacle. Parallel (for the most part) with the principal wreath, separated by a groove, runs a secondary line of shorter and slighter cilia. The building operations of Melicerta are most interesting, and may be shortly described. Particles of floating matter, attracted in abundance by the action of the principal wreath, are hurried along the groove to the buccal funnel. Here they are parted : some swallowed as food ; others borne over a projection, known as the chin, into a small hollow—the ciliated cup. As they gradually collect in this they are whirled round, mixed with some binding secretion, and assume a yellowish colour. In three or four minutes the animal has thus completed one of the pellets with which it builds its tubular house. Watching closely, we may now see the head suddenly plunged down, and the pellet deposited on a previously selected part of the tube's edge. As many as 6,000 pellets have been estimated to exist in a very large Melicerta tube. Allowing three minutes as the time requisite to make and lay each of these, the number mentioned would represent twenty-five days' incessant work at twelve hours a day.

Close by we observe a very different tube—dark, granular, and slightly narrowing downwards. Its owner, *Limnias ceratophylli*, seems to be more sociable than Melicerta. Hence we frequently find six or a dozen of these in near proximity. The animal displays a long and somewhat narrow corona, reminding us of two incomplete circles connected by a concave curve. It shows the principal and secondary wreaths to great perfection. The cilia can easily be traced right down the buccal funnel. The antennæ are much shorter than those of Melicerta. In the early life of *Limnias ceratophylli* its tube is transparent, and the long, thick, wrinkled foot, which is so common in this family, is clearly shown ; later on the granular accretions outside the tube render it opaque. In both Limnias and Melicerta the moving trophi form a very

obvious feature, but great part of the body is concealed. We notice a slender, tapering, rusty-brown tube, up which a long antenna is pushing its way. Cautiously it sweeps the water, groping in all directions, and bending right over the edge of the tube, before its owner's head comes forth. When at length this is seen we can scarcely suppress a laugh, so grotesquely disproportionate is the dorsal antenna to the size of the animal. As compensation, the ventral antennæ are barely perceptible, if they exist at all. This animal is *Cephalosiphon limnias*, and displays a somewhat circular wreath, as well as two red eyes, one on each side of the antenna; it has a long and slender foot. It is the dorsal surface which is arched in this Rotifer; in other Melicertadæ it is the ventral. We shall find yet one more of the same family ensconced in a dirty-brown irregular tube, needlessly large, as it seems, and looking more like a mass of debris than a structure. This is the house of *Oecistes crystallinus*, and it compares with that of Melicerta much as a mud hut might with a neat brick villa. The animal's projecting head displays a corona almost a perfect circle in form. There are two very short ventral antennæ. The ciliary wreath in action presents the most complete circular wheel we have seen among the Rotifers. For the beauty of this we gladly forgive the animal its inferior architectural abilities. We may, perhaps, light upon a second Oecistes—probably the species *longicornis*. Its very long antennæ are held out like a pair of arms. Its tube is similar to that just described, but a little more compact. One form of trophi prevails throughout the family of Melicertadæ—known as the malleo-ramate. On account of its importance, a separate engraving of this type is given in fig. 1. Passing our weed along, we next notice an object that much resembles a snake's head with a brush of very long hairs protruding from the mouth. The snake's head, as it opens out, divides the brush into five bunches of most delicate setæ of extreme length. The front of the head (or corona) then displays, in most cases, five tapering prominences (the so-called lobes) separated by graceful curves. In some species (not all) the lobes are crowned with round knobs. The dorsal lobe is usually larger than the others. On the knobs the setæ are located, but may also continue round the curves. This strange and withal beautiful object is the head of a Floscule.

(To be continued.)

Cuckoos.—On 2nd September a friend of mine took an egg of the Pallid Cuckoo (*Cacomantis pallida*) from the nest of the English Blackbird, in the Albert Park. The Pallid and Fantail Cuckoos have been rather plentiful near Melbourne this season, eggs of both species having been collected in nests of the White-plumed Honeyeater (*Ptilotis penicillata*).—C. French, jun.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part XII.

NOCTUINA *(continued).*

EUPLEXIA. Stph.

377. E. spilophanes, Meyr. (MSS.)
Windsor, Melbourne, &c.

378. E. ingerrima, Gn. (*Mamestra ingerrima*, Gn., Noct., i., 201, 318; Walk., Lep. Het., ix., p. 237).
Gisborne, Oakleigh, &c.

379. E. mamestroides, Walk. (Char. Und. Lep., p. 71, 1869).
Melbourne, Gisborne.

380. E. confundens, Walk., Lep. Het., xi., 544, No. 3, 1857; *E. exclusa*, *ib.*, *loc. cit.*, p. 545, 1857; *E. indocilis* (part), *ib.*, *loc. cit.*, No. 8; *Hadena familiaris*, *ib.*, *loc. cit.*, 597; variety *H. extima*, *ib.*, *loc. cit.*, p. 599; *H. punctisigna*, *ib.*, *loc. cit.*, 600).
Melbourne.

381. E. sepultrix, Gn. (*Mamestra sepultrix*, Gn., Noct., i, p. 200, No. 317, 1852; *Hadena expulsa*, *ib.*, *loc. cit.*, ii., p. 93, No. 800, 1852; *Euplexia emergens*, Walk., Lep. Het., xi., 544, 1857; *E. indocilis* (part), *ib.*, *loc. cit.*, 545, 1857; *Hadena lutra*, Walk., *loc. cit.*, 598. 1857).
Windsor, Gisborne, Melbourne, &c.

MAMESTRA. Tr.

382. M. Ewingii, Westw. (*Noctua* (*Xylophasia?*) *Ewingii*, Westw., Tr. Ent. Soc. Lond., ii., p. lv., pl. xx., fig. i., 1837; *Cloantha composita*, Gn., Noct., ii., p. 114, No. 832, 1852; *Mamestra maori*, Feld., Reis. Nov., pl. cix., 24; *Leucania dentigera*, Butl., List Ent., ii., 542, 1880; *Morrisonia Ewingii*, *ib.*, Tr. Ent. Soc. Lond., 657, 1890).
Gisborne, Oakleigh, Melbourne, &c.

AMPHIPYRA. Gn.

383. A. sanguinipuncta, Gn. (Sp. Gen. Noct., pl. 18, fig. 2; *Mamestra trilineata*, Walk., Lep. Het., xxxii., p. 669).
Gisborne, Kewell, Melbourne.

ANOPHIA. Gn.

384. A. ACRONYTOIDES, Gn. (Noct., iii., 47, 1,378, Walk., Lep. Het., xiii., 1,128).
Melbourne, Gisborne.

SPODOPTERA. Gn.

385. S. MAURITIA, Bdv. (female, *Hadena mauritia*, Bdv., Faun. Madag., 92, pl. 13, fig. 9, 1833; male, *Spodoptera nubes*, Gn., Noct., i., 155, 246, 1852; female, *S. filum*, *ib.*, *loc. cit.*, 248, 1852; female, *Prodenia infecta*, Walk., Lep. Het., ix., 196, 1856; male, *P. insignata*, *ib.*, *loc. cit.*, 197, 1856; female, *Caradrina triturata*, *ib.*, *loc. cit.*, x., 295, 1856; female, *Agrotis transducta*, *ib.*, *loc. cit.*, 344; male, *Prodenia permunda*, *ib.*, *loc. cit.*, xi., 723, 1857; female, *Laphygma gratiosa*, *ib.*, *loc. cit.*, Supp. ii., 651, 1865; male, *L. squalida*, Walk., *loc. cit.*, 652; male, *Prodenia venustula*, *loc. cit.*, 654; male, *Celæna bisignata*, *ib.*, *loc. cit.*, 679; female, *Agrotis alieana*, *ib.*, *loc. cit.*, 694; female, *A. bisignata*, *ib.*, *loc. cit.*, 702; male, *Hadena obliqua*, *ib.*, *loc. cit.*, iii., 736; *Spodoptera mauritia*, Butl., Tr. Ent. Soc. Lond., 665, 1890).
Melbourne.

The present species bears out my opening remarks *re* the inextricable confusion of genera.

386. S. EXEMPTA, Walk. (male, *Agrotis exempta*, Walk., Lep. Het., x., 355, 1856; female, *Prodenia bipars*, *ib.*, *loc. cit.*, xi., 734, 1857; male, *P. ingloria*, *ib.*, *loc. cit.*, xv., 1,679, 1858; *Spodoptera exempta*, Butl., Trans. Ent. Soc. Lond., 666, 1890).
Melbourne, Kewell, &c.

PRODENIA. Hb.

387. P. LITTORALIS, Bdv. (*Hadena littoralis*, Bdv., Faun. Ent. Madag., p. 91, pl. 13, fig. 8, 1833; male and female, *Noctua retina*, Frey., Neu. Beitr., v., p. 161, No. 865, pl. 478, figs. 2 and 3, 1845; male and female, *Prodenia ciligera*, Gn., Noct., i., p. 164, 260, 1852; female, *P. testaceoides*, *ib.*, *loc. cit.*, p. 165, No. 262, 1852; female, *P. subterminalis*, Walk., p. 196, No. 13, 1856; male, *P. glaucistriga*, *ib.*, *loc. cit.*, 197, No. 15; male, *P. declinata*, *ib.*, *loc. cit.*, xi., 723, 1857).
Melbourne.

COSMODES. Gn.

388. C. ELEGANS, Don. (*Phalæna elegans*, Don., Ins. New Holl.; *Cosmodes elegans*, Gn., Noct., vi., 294).
Gisborne, &c., &c.

WESTERMANNIA. Hubn.

389. W. OCELLATA, Lucas.
Myrniong, Kewell.

TOXOCAMPA. Gn.

PANTYDIA. Gn.

390. P. SPARSA, Gn. (Noct., ii., 437, 1,308; Walk., Lep. Het., xiii., 1,038; *P. diemeni*, Gn., Noct., ii., 437; *P. recondita*, Walk., Noct., 1,039; *Toxocampa orthosiodes*, Walk., Supp., 873; *P. canescens*, *ib.*, Char. Und. Lep., p. 72, 1869).

391. P. CAPISTRATA, Lucas.
Melbourne, Gisborne.

PLUSIA. Tr.

392. P. ARGENTIFERA, Gn. (Noct., vi., 352).
Gisborne, Melbourne, &c.

393. P. SUBSIDENS, Walk.
Gisborne, Melbourne.

394. P. VERTICILLATA, Gn. (Noct., ii., 344, 1,168, 1852).
Melbourne, Oakleigh.

PLUSIODONTA. Gn.

395. P. CHALSYTOIDES, Gn. (Noct., ii., 360, 1,201, 1852; *Deva conducens*, Walk., xii., 963, 1857; *Plusia agens*, Feld., Reis. Nov., iv., pl. 110, f. 32, 1872).

COSMOPHILA. Bdv.

396. C. XANTHINDYMA, Bdv. (Faun. Ent. Madag. Lep., 94, pl. 13, fig. 7, male, 1834; *C. indica*, Gn., Noct., ii., 396, 1,256, female, 1852; *C. variolosa*, Walk., xi., p. 750, 1857; *Cirrædia edentata*, Walk., *loc. cit.*, p. 750.
Melbourne, Kewell.

ANOMIS. Gn.

PHLEGETONIA. Gn.

397. P. CONSPICIENDA, Walk. (*Patæta conspicienda*, Walk., Lep. Het., xv., 1748; *Phlegetonia conspicienda*, Meyr., Tr. Ent. Soc. Lond., 476, 1889).
Gisborne, Melbourne, &c.

HYPOGRAMMA.

HULODES. Gn.

ANODAPHIA. Gn. (?)

DIATENES. Gn.

398. D. LAWSONI, Feld. (Reis. Nov., pl. cxi., fig. 30).
Melbourne, Gisborne.

399. D. GERULA, Gn. (Noct. ii., 443; Walk., Lep. Het., xiii., 1,043, 1857; female, *Homoptera costalis*, Walk., *loc. cit.*, p. 1,072; male, *Setida quadrisignata*, *ib.*, *loc. cit.*, xv., 1,853, 1858).
Gisborne, Murrumbeena, &c.

PRAXIS. Gn.

400. P. MARMARINOPA, Meyr. (MSS.)
Melbourne.

401. P. PORPHYRETICA, Gn. (Noct., iii., 29, 1,355; Walk., Lep. Het., xiii., p. 1,087).
Melbourne.

402. P. EDWARDSI, Gn. (Noct., iii., 29, 1,356; Walk,, Lep. Het., iii., 1,087).
Melbourne, Oakleigh.

HOMOPTERA. Bdv.

OPHIDERES. Gn.

MÆNAS. Hb.

PHYLLODES. Bdv.

NYCTIPAO. Hb.

POTAMOPHORA. Gn.

OXYODES. Gn.

SPIRAMIA. Gn.

CALLIODES. Gn.

DONUCA. Walk.

403. D. SPECTABILIS, Walk. (Lep. Het., xxxiii., p. 926. *Serrodes* (?) *xanthorrhea*, Feld. (Reis., Nov., pl. cxii., fig. 21, 1874).
Melbourne.

DASYPODIA. Gn.

404. D. CYMATODES, Gn. (Noct., iii., 175; Walk., Lep. Het., xiv., 1,299).
Kewell, Melbourne.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th November, 1894. The president, Mr. H. T. Tisdall, F.L.S., occupied the chair, and over a hundred members and visitors were present.

LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library:—"Glacial Deposits of Bacchus Marsh District," by Messrs. G. Sweet, F.G.S., and C. C. Brittlebank, from the authors; "Oological Notes," by Mr. A. J. North, F.L.S., from the author; "Proceedings of Linnean Society of New South Wales" (second series), vol. viii., part 4, and ix., part 1, from the Society; "Journal and Proceedings of the Royal Society of New South Wales," vol. xxvii., from the Society; "Transactions of Geographical Society of Australasia (Victorian Branch), vol. xi., from Society; "Proceedings of Royal Society of Queensland," vol. x., from Society; "Proceedings of Australasian Association for Advancement of Science," vol. v., Adelaide meeting, from Association; "Journal of Bombay Natural History Society," viii., 4, from the Society; "Botany Bulletin," No. ix., and "Botany Abridged," by J. F. Bailey, F.L.S., from the author; "Report of Trustees of the Australian Museum," 1893, from the Trustees; and *Geelong Naturalist*, iii., Nos. 4 and 5, from the Gordon College Science Society, Geelong.

REPORTS.

Reports of excursions to Bayswater, Springvale, and Tarrawarra were received from the respective leaders—Dr. W. Macgillivray, the Rev. E. H. Hennell, and Mr. H. P. C. Ashworth.

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that there was a good attendance at the practical meeting on 22nd October, at which a demonstration of bird-skinning was given under the direction of Mr. G. A. Keartland. Different methods of skinning were shown by Mr. Keartland, and Mr. Ashworth, who assisted.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. Bickford, J. Haase, C. M. Maplestone, R. W. Wigmore, and Rev. E. W. C. Ferrall were duly elected members of the Club.

PAPER.

By Prof. W. Baldwin Spencer, M.A., entitled "In Central Australia."

This took the form of a lecturette, describing the country traversed by the recent Horn Exploring Expedition in the locality of Lake Amadeus and the Macdonnell Ranges, in Central Australia, and was well illustrated by a series of some 70 lantern slides depicting the flora and geological features noted, also some of the ethnological observations made, as well as some of the difficulties connected with travel in such barren country. The author pointed out the great advantages expeditions now had over those of the early explorers owing to the use of camels, without whose aid their party could not have accomplished its task in the short time at its disposal. Special interest was manifested in the views, owing to the fact that they were the first photographs which had been taken of many parts of Central Australia. The lantern was well managed by Mr. J. Searle.

Owing to an unavoidable delay, and the length of the paper, its discussion had to be postponed.

NATURAL HISTORY NOTES.

Mr. C. French, jun., contributed a note recording the taking of the Rosehill Parrakeet's eggs in an old nest of the Temporal Pomatostomus.

Mr. J. Shephard contributed some notes with reference to a phosphorescent Ostracod recently observed by him at Brighton Beach.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. F. G. A. Barnard.—Saw-flies (larvæ obtained on Box Hill Excursion, June, 1894). By Miss S. W. Cochrane.—Paintings of rare Victorian Orchids. By Mr. A. Coles.—Three sheets of Australian birds' eggs, containing thirty-three hand-painted illustrations; silver ore from Mount Stewart, N.S.W. By Mr. C. French, F.L.S., on behalf of Department of Agriculture.—Indian Silk Moths. By Mr. C. French, jun.—Eggs of Queen Victoria's Rifle Bird and Lewin's Honeyeater, from Queensland; clutch of six eggs of *Platycercus eximius* taken in an old nest of the Temporal Pomatostomus near the Werribee. By Mrs. Flatow.—Seaweed and Polyzoa from Portland. By Mr. R. Hall.—Nest, eggs, and skin of White-winged Corcorax, from Swan Hill (weight of nest, 9 lbs. 6 ozs.) By Mr. W. H. F. Hill.—Case of Victorian Lepidoptera, taken recently. By Mr. Bernard F. Hill.—*Diamnea bicolor*, the Solitary Ant (male and female). By Mr. G. A. Keartland.—Eggs of *Polytelis Alexandræ*, Princess of Wales Parrakeet; *Platycercus Baueri*, Bauer's Parrakeet; *P. flaviventris*, Yellow-bellied Parrakeet; *P. pallidiceps*, Pale-headed Rosella; *P. eximius*, Rosehill Parrakeet; and *Emblema picta*, Painted Finch, all from Central Australia. The exhibitor called attention to the eggs of *Polytelis Alexandræ* and *Emblema picta*, as this is believed to be the first time eggs of either of these birds

have been taken from the nest; the former are the same size and shape as eggs of *P. eximius*, but smooth and glossy on the surface as a pigeon's, whilst those of the latter are similar in size and shape to the eggs of the Banded Grass Finch, *Pœphila cincta*, possessing the same blue tinge of colour. By Baron von Mueller, K.C.M.G.—*Acacia decurrens*, from Terricks (not found so far west before), and *Westringia Dampierii*, from Marong, collected by Mr. A. Purdie; *Pterostylis barbata* with two flowers on single stem, from Sandringham; *Caladenia Cairnsiana*, from Fernshaw (new locality), collected by Mr. C. French, jun.; *Callistemon lanceolatus*, from Macalister River, collected by Miss M. Macdonald; *Eriostemon Hillebrandi*, var., and fungus *Cyttaria Gunnii*, growing on *Fagus Cunninghami* (Native Beech) from Upper Latrobe River, collected by Mr. J. G. Luehmann. By Mr. G. J. Page.—Slide of fossil Foraminifera (96 forms), from Laverton; slide of Diatoms (130 forms). By Mr. G. Shepherd.—Nest and eggs of Orange-winged Sittella, *S. pileata*; three eggs of Little Chthonicola, *C. sagittata*; three eggs of Striated Reed Lark, *Calamanthus fuliginosus*, and egg of Ash-coloured Cuckoo, *Cuculus cinereus*, found in nest of Scarlet-breasted Robin, *Petrœca Leggii*. By Mr. J. Shephard.—A marine Ostracod, under microscope, in illustration of note.

After the usual conversazione the meeting terminated.

THE ROTIFER IN MELBOURNE.

By W. Stickland.

(Concluded from page 104.)

The arrangements for the capture of food being very unique in this genus, and difficult to make out, may require brief description. There are, in short, three cavities for this purpose. The cup-like corona constitutes the first, which can be closed below by a very contractile collar. On a portion of the upper surface of this collar, sloping ventrally, lies the true ciliary wreath, in shape like a horseshoe. Beneath the collar is the second cavity—the vestibule. A strong diaphragm forms the bottom of this. In the diaphragm is a slit, on each side of this a chitinous lip. This slit is the buccal orifice, and opens into a tube, which hangs freely in a third cavity below, called the crop. The Floscule, therefore, drags its living victims down through the corona into the vestibule, where they may remain for a time; they are then forced through the tube to their doom in the crop. The trophi, in the shape of two small double hooks, not enclosed in any mastax, intervene between the crop and the stomach. The rest of the structure is on the usual plan.

The Floscule's body walls are mostly so opaque as to conceal the internal parts; but patient observation has disclosed the

nervous and vascular systems, eyes deeply buried in the integument, and a minute antenna on the dorsal lobe. This favourite and beautiful genus is represented in our pond by several species. We believe we have been able to identify *F. cornuta*, *F. coronetta*, *F. ornata*, and a large species without knobs is probably *F. campanulata*. The drawing represents *F. cornuta*, which, when favourably seen, is recognizable by the long, finger-like, flexible process attached to the dorsal lobe of the corona. The Floscules, which often present brilliant coloration—green and brown—in the stomach and intestine, are partially enclosed in a wide sack-like tube. This, from the extreme tenuity of the material, is frequently almost invisible. Six or more eggs may sometimes be seen in the tube, ranged along the animal's slender foot. Some Floscules have the vice of gluttony. They have been seen to overload their crops so greatly that a complete block ensued. In this extremity the animal turns its front part literally inside out, expels the contents, and, resuming its normal form, commences again—like a good old Roman epicure.

During our study of this, the more stable part of the Rotifer population, other and very different species have appeared—creeping like leeches, or swimming among the weeds. Lithe and flexible, these can bend their bodies double, elongate them enormously, or roll them up into compact little balls. These all belong to the second order of Rotifera—the Bdelloida (Gr. *bdella*, a leech), and to the family Philodinadæ. One description virtually applies to all. In addition to the peculiarities just mentioned, they possess a corona consisting of two circular lobes set side by side and surrounded by a double wreath of cilia. The principal wreath, in motion, presents strikingly the appearance of a pair of rotating wheels. These, however, are not fully complete. An arc is, as it were, cut out of each, towards the centre of the corona. The Philodinadæ possess also a characteristic foot. It is telescopic—that is, it consists of several joints, so graduated in size that each can be drawn into the one above, as in a ship's telescope. The last joint has three toes, and the second last a pair of spurs. The animal, at rest, draws these down, holding on by them as well as by the toes. The telescopic idea is carried still further in this family—a three-jointed dorsal antenna being constructed on the same plan. The Philodinadæ have a tendency towards yellow colour, and often present a fluted or corrugated appearance of the skin, running lengthwise, strongly marked in some specimens. Attention must be paid to the frontal column—a short, thick projection which appears at the front of the head in species of this family before the corona is unfurled. By the aid of this two genera are distinguished. Of the genus Philodina, the large handsome species *P. citrina* may

be abundant about our weed. It can readily be known by the clear, bright, transparent lemon colour with which the trunk (not the extremities) is tinged. Two bright red eyes are obvious, set on its neck, as in all the Philodinæ, and there is a prominent dorsal antenna. Our engraving shows this Rotifer in what may be called its sitting posture, the foot being partially closed up. When it settles down thoroughly to work, it assumes this attitude, and is then steady enough to satisfy the most exacting observer. Another species of the same genus sometimes abundant appears to be the Large-wheeled Philodina, *P. megalotrocha*. Its body is shorter, relatively plumper, and slopes more gradually to the foot. The feature that strikes the eye most at first sight, however, is the greater size of the wheels when expanded. This quaint and pretty animal, smaller than the last mentioned, but otherwise very similar (with the exception of the colour), frequently behaves in a way that annoys the observer. No sooner is its wreath unfolded than it detaches itself and commences to swim away, so that we have to chase it from place to place.

The genus Rotifer is distinguished by the fact that the eyes are situated on the frontal column, to which allusion has already been made. A species of this genus that is frequently present is the Common Rotifer, *R. vulgaris*. As the engraving shows, this is long and colourless, and much more slender than the Philodinæ. We find yet another species of the same genus. It is as large and stout as a Philodina, and yellow in colour. Added to these features its extraordinarily long foot stamps it as being probably *R. macrurus*. One type of trophi is universal in this second order. On account of its wide prevalence we have given a separate engraving of this, which is called the ramate type (fig. 2). In observing a Rotifer of this order, the beginner is sometimes puzzled to notice a second pair of trophi (often in motion) towards the hinder part of the animal. This mystery is explained by the fact that the eggs are hatched in the mother's body, so that we see the *unborn* young, fully developed. These Philodinadæ possess a remarkable property, which has given rise to an immense amount of heated controversy during the last two centuries. When the water in which they have been living dries up (provided the evaporation be not too rapid), they roll themselves up into the form of a ball, coat themselves with a gelatinous substance excreted by the skin, and retire from active life till water is once more supplied. The excretion, after hardening, protects the internal moisture of the animal, which can survive in this condition many years.

The third order of Rotifers comprises those which are essentially swimmers. Ploima (sailing) is the name given to these. They include the liveliest, most intelligent, and the most varied

in aspect and equipment of the whole class. The order falls into two great divisions. To the first belong those Rotifers which possess no hard covering ; to the second those which are protected by a chitinous shield. The first division is chiefly represented in our pond by members of the family Notommatadæ. These are in many cases not easy to identify. The only one we shall mention is the pretty little *Furcularia longiseta*—a form specially marked by the great length of its toes. The lateral aspect, as seen in the engraving, shows a head well rounded, its front covered with cilia, and a body having an arched dorsal and concave ventral surface. One small joint represents the foot. The toes, unusually long, are round and thick at the base, and taper to a point, but their unique peculiarity is that one is a full third longer than the other. The body of this Rotifer is partly coloured yellow. A deep-set eye, attached to the brain, can be found by careful focussing. A peculiarity of this creature is its power of leaping, by which it sometimes vanishes from the field of view in the twinkling of an eye.

To our mind the true glory of the Ploima is found in the second division—the Loricata. Their chitinous lorica is glassy, often clear as crystal, sometimes ornamentally dotted or stippled. It is usually outlined by graceful curves, and in many genera runs out into points or spines at front or back. It consists of dorsal and ventral or lateral plates variously joined together. A species that is likely to show itself is *Mastigocerca carinata*. Its lorica is shaped somewhat like a narrow barrel. Along the front half of its dorsal surface a high arched ridge runs. This both gives the Rotifer its name and makes it easy to identify. The sides of the ridge are corrugated. The front of the head bears a number of small tubercles, on which the cilia are set. A red eye-spot is conspicuous, attached to the brain. The very long trophi consist of three unequal rod-like portions. The animal's one toe is very long, slender, and tapering, and has two or three stylets at its base. There is usually bright green colour in the stomach of this Rotifer, which is a very pleasing object, whether seen gliding rapidly through the open water, or half-buried in tangled algæ, switching its long, inflexible toe from side to side. But the beau ideal of an armoured Rotifer now swims by—*Dinocharis tetractis*—sheathed from head to toe in a thick mail, which rather suggests a crustacean shell, and presents no vulnerable point. The lorica of the body, somewhat vase-like in shape, viewed dorsally, is facetted, or divided into a number of small areas, and prettily dotted. At the back it curves sharply to a blunt point. Beneath this projects a foot of several shapely joints, the first adorned with a pair of spurs. Two long toes curving outwards complete the foot. This animal's rounded head is protected by a separate piece of armour, which might be called

its helmet. It consists of two movable pieces that can be shut down when the head is drawn in. A bright red eye is set at the front of the mastax. This handsome Rotifer is no less hardy. We have kept one on a slide for more than a week, giving it only a fresh drop of water each day. Playing about the weeds we see representatives of the beautiful genera Euchlanis and Salpina; but our attention is distracted from these to a Rotifer, smoothly gliding, that bears an unusually broad shield. Should it kindly anchor itself in clear water we shall find in this most transparent creature, *Pterodina patina*, a charming sight. Its lorica, all but circular in form, consists of an upper and a lower plate, greatly flattened, and united at the edges, but swelling out towards the middle, so that a concavity is formed for the animal's body. This concavity continues to the front of the lorica, and here we see the slightly protruding head, with its corona of two circular lobes and its pair of eyes. From a posterior opening, well under the dorsal plate, a thick wrinkled foot issues. This terminates uniquely in a ciliated cup. The gastric glands are the most striking internal parts. They resemble two long streamers, spreading out, one each side of the stomach. The Pterodina unites in itself some characters of all three orders, having the thick wrinkled foot of the first, the double rotating wheels of the second, and the lorica of the third. Some of its muscles show a coarse striation. The second drawing of this animal exhibits its grotesque appearance as seen from the side. The dexterity displayed by this Rotifer in making way through thick masses of algæ is surprising, in view of the wide spread of its lorica. A second species of the same genus inhabits our pond. It presents in a marked manner the features of *P. reflexa*, as described and figured by Hudson and Gosse in the supplement to their work. Now we may see, tearing through the water with fierce impetuosity, the strongest swimmer that has yet appeared. This is Baker's Brachionus. In the genus Brachionus the lorica is broad, deep, and roomy, narrowing slightly towards the front and variously shaped at the back. Prominent spines adorn the front edge of the dorsal plate. Baker's Brachionus has six of these spines. The central and longest pair curve outwards, enclosing the dorsal antenna between them. The corona bears several prominences, crowned with strong setæ, and is rounded at the sides into circular lobes. The ciliary wreaths around these form two handsome wheels. The whole internal economy is perfectly displayed, the lorica being beautifully transparent. A large eye, crimson rather than red, is set on the brain. The hinder part of the lorica is so cut out that two strong lateral spines are formed. In the wide gap between these we see the foot—thick, wrinkled, flexible as an elephant's trunk, and terminating with two small toes. It can be entirely withdrawn into the body. In the same wide space, and

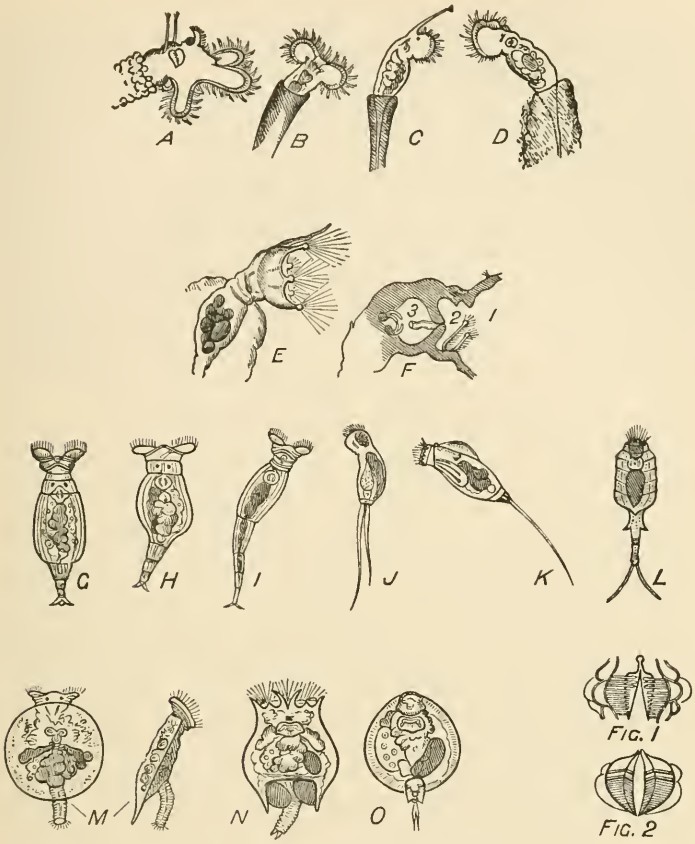
above the foot, we sometimes observe one or more eggs, attached by threads so delicate that we have never yet made them out. This fine Rotifer, when first placed on the glass, seems to become very wild. Its mad rush through the water has already been noticed. When this has ceased we often see the animal take hold of the cover glass with its foot and dash itself from side to side in a way that seems to threaten instant destruction. After a while it calms down, becomes still, and often affords an excellent opportunity for study. It is also very fearless, and remains quite unconcerned when a commotion occurs in the water which causes every other Rotifer to retreat into its house or close itself up with the greatest celerity. Another species of Brachionus occurs in our pond, probably *B. urceolaris.* One more very transparent and pretty Rotifer that meets us now and then is, we think, *Metopidia solidus*, of which an engraving is given; its lorica approaching a circle in form, decorated near the edge with a ring of somewhat parallel lines, has been fancifully compared to a coin, hence the specific name.

Many smaller Rotifers yet remain, but must be passed over. Among these is one of extremely acrobatic proclivities, which spends most of its time in clambering and tumbling about the threads of algæ in a very comical way. It seems to be the *Colurus obtusus* of Hudson and Gosse.

A sufficient number have been noticed to prove that in the convenient pond mentioned abundant material can be obtained, without the slightest trouble, by anyone who wishes to pursue the study of this class of animals.

Of the last scene of all that ends the strange, eventful history of the Rotifer's life we need not say much. We sometimes, though seldom, see them fall victims while living. The dead body of a big Rotifer, however, furnishes a rich banquet for the smaller forms of life. Then is their hour of sweet revenge. So well do they take advantage of it, and so rapidly multiply (in such a case), that within one day we have seen a large Lacinularia reduced to an empty skin, no vestige of any internal part being left. It may be worth while to remark that we have sometimes found large dead Rotifers overgrown with a minute fungus, hyphæ stretching out on all sides. Whether in such cases the growth of the fungus has preceded or followed death there is nothing to show.

While we, seated at the microscope, have thus been studying these tiny links in the chain of universal Being, old Time has not been idle. A sensation of advancing chilliness warns us that the hour is late; midnight is long past; the fire has died down in the grate. We must perforce—not without reluctance—pack away our instruments, return the weeds to their bottle, and say "Good-night" to the "Rotifers of Melbourne."



EXPLANATION OF FIGURES.

A.—Melicerta ringens, oblique view.
B.—Limnias ceratophylli, ventral view.
C.—Cephalosiphon limnias, side view.
D.—Oecistes crystallinus, oblique view.
E.—Floscularia cornuta, side view.
F.—Section of Floscule, showing :—
1.—Cavity of corona.
2.—Vestibule.
3.—Crop.
G.—Philodina citrina, dorsal view.
H.—Philodina megalotrocha, dorsal view.
I.—Rotifer vulgaris, dorsal view.
J.—Furcularia longiseta, side view.
K.—Mastigocerca carinata, side view.
L.—Dinocharis tetractis, dorsal view.
M.—Pterodina patina, dorsal and lateral view.
N.—Baker's Brachionus, dorsal view.
O.—Metopidia solidus, dorsal view.

TYPICAL TROPHI.

Fig. 1.—Trophi of Melicertadæ.

Fig. 2.—Trophi of Philodinadæ.

EXCURSION TO CHELTENHAM.

A FAIR number of members of the Club met at the Cheltenham station on Saturday afternoon, 18th August. The excursion having been arranged in the interests of botanists and collectors of pond life, the former, under the leadership of Mr. C. French, jun., struck across the heath ground to the Ti-tree at Black Rock, and from thence along the coast to Sandringham. The curious little plant *Phylloglossum Drummondi* was found in swampy places rather abundantly, and among other plants collected may be noted *Epacris impressa* (red and white varieties), *Caladenia deformis*, *Pterostylis nutans*, *P. concinna*, *P. pedunculata*, *P. nana*, *Cyrtostylis reniformis* (very fine specimens, some having as many as eight to twelve flowers on one stem), *Acianthus exsertus*, *Eriochilus fimbriatus* (just finished flowering). Also a specimen of *Loranthus celastroides* was found growing on the *Leptospermum lævigatum* ; this plant is rather rare in this locality.

On reaching the spring whence the Cheltenham water supply is partially obtained the botanists went ahead, leaving the "pond life" workers, under the leadership of Mr. J. Shephard, to pursue their investigations more leisurely. After collecting sundry water plants and bottling water, the party proceeded over the open country for about a mile, to the spot visited last year, pausing on the way to examine several swampy places. On reaching the spring a more careful examination was made, and all available vessels filled for subsequent investigation. Volvox was noted, but was not plentiful. Among the forms seen on searching over the material was the Rotifer found last year and mentioned as being intermediate between *Anurea cochlearis* and *A. stipitata* ; also several Floscules. Some very interesting collared Protozoa were found. One form agreed exactly with Kent's description of *Salpingœca marina*, though, of course, it was a freshwater species. Another might with confidence, from its shape and size, have been identical with *S. amphoridium*, but no lorica was detected, though probably with more prolonged examination this might have been demonstrated. The blue Stentor, *S. cœruleus*, was found in numbers. Mr. W. Stickland reports a representative of the Vorticellidæ with vivid green corpuscles embedded in its substance. A cursory examination of Kent did not produce any reference to the occurrence of chlorophyll in this family, though so common among the Protozoa.—C. FRENCH, jun.; J. SHEPHARD.

EXCURSION TO FRANKSTON.

THIS excursion took place on Saturday, the 29th of September, when the attendance was very small, although the day was a delightful one, and the country, for wild flowers at least, was

perhaps seen at its best. Upon arrival at Frankston we kept towards Mount Eliza, but owing to the short time at our disposal were able to travel but a few miles from and to the railway station. Orchids were fairly numerous, Prasophyllum, Pterostylis, Lyperanthus, and other ordinary species being beautifully in flower, the whole place being one continuous mass of bloom. The beautiful *Euphrasia Brownii* grows here as we had never before seen it, the variety also being much darker than usual. Amongst bog plants we noticed the elegant *Drosera binata* and *D. glanduligera*, also *Lycopodium laterale* and other well-known plants. Insects were scarce, although some specimens of Curculionidæ, Cleridæ, Staphylinidæ, Xylonychus, &c., were captured, it being too early in the season for most insects, especially for the Coleoptera and Lepidoptera.—C. French.

NOTICES OF VICTORIAN FUNGI.

By Dr. A. Morrison.

New or Imperfectly Described Uredineæ—*continued.*

Puccinia coprosmatis, var. *opercularicæ.*

Sori hypophyllous, deforming the leaf and forming a concavity on the opposite side, prominent, surface and border uneven and lobed, with small islands outside their margin, reddish brown with a thin pruinose stratum on surface, and remains of cuticle occasionally seen at border or between the lobules, zone of leaf surrounding them discoloured yellowish. Teleutospores reddish brown in the mass, pale yellowish brown singly, densely packed in the sorus, outline generally oblong-fusiform, the distal cell bluntly pointed and the lower tapering to the pedicel, with a slight constriction between the two; largest 40–50μ. x 13–20μ.; pedicels considerably longer than spores.

Scantily disposed on leaves and petioles of young plants of *Opercularia varia*, J. D. H., Oakleigh, November.

The prominent compact and lobulate or composite character of the sorus, and the general agreement between the teleutospores of this and the preceding, sufficiently indicate specific identity, while the differences in leaf structure between the two allied host-plants may suffice to account for the minor variations in the spores in the two cases. The leaf of *Coprosma Billardieri* is thin and almost membranous in texture and of a dingy colour, and at the same time the teleutospores of its fungus are darker and less plump than those of the Opercularia form, which are brighter and larger, just as the host-leaves are of a brighter green and thicker in texture. *Æcidium cystoseiroides*, Berk., Fl. Tasm., ii., 270, Sacc., Syll., vii., p. 833; Cooke, Handb., 341, on *Opercularia varia*, is recorded from Tasmania.

PUCCINIA INVESTITA, Schwein., Syn. N. Am. Fungi, No. 2,932; Peck, 25, Rep., p. 117; Sacc., Syll., vii., p. 707.

Sori plentifully scattered on stems and leaves; on latter amphigenous, but more numerous on under surface, bursting through epidermis and woolly tomentum, bordered by ruptured cuticle, circular or oval in outline or on stem lenticular, under 1 mm. in diameter. Spermogones immersed among spores in sori, numerous, subglobose with conical apiculus, walls dark from blackish network on outer surface; spermatia tinged brownish, fusiform. Uredospores greatly predominating in the sori, which are mostly reddish-brown in colour, subglobose, deep brown, sparsely verruculose, largest 23–24μ. x 20–24μ. Teleutospores few and generally mixed with uredospores, dark chestnut brown with almost black outline, distal cell somewhat the larger and obtusely pointed by thickened epispore or rounded, with a slight external constriction between the two cells; largest 30–40μ. x 20–23μ. Unicellular teleutospores not infrequent, 26μ. x 18–20μ.

On leaves and stems of *Gnaphalium purpureum*, L., Oakleigh, January.

Evidently the same species as that named above, and infesting various members of the genus Gnaphalium in North America, where, however, only the teleutospores have been found. *Æcidium gnaphaliatum*, Schwein., is found on a North American species of the same genus, while *Uredo gnaphalii*, Speg., on *G. Americanum*, has been described from Argentina.

PUCCINIA RUMICIS-SCUTATI (D. C.), Winter, Pilze, i., 187; Sacc., Syll., vii., p. 636, var. Mühlenbeckiæ; Cooke, Grevillea, xix., 46, Handb., p. 336.

Uredospore sori hypophyllous, scattered, minute (under 1mm.), on discoloured circular spots, which are sometimes confluent and accompanied by corresponding spots on upper surface, on which also are occasionally opposite sori; epidermis bullate, at length ruptured, exposing the flat pale-brown spore bed; uredospores pale yellowish brown, ovate, obovate or oblong, echinulate, largest 25–30μ. x 16–20μ.

On green and fading leaves of *Mühlenbeckia adpressa*, Meissn., Brighton, May.

Teleutospores only of this variety described by Cooke, but not observed in this specimen. The uredospores, it will be seen, correspond pretty closely with the characters given for the European specimens, except as regards the size of the spores—a point, however, of limited significance.

ERRATA.—The title of article in *Victorian Naturalist*, xi., page 90, should read as above. Page 90, line 20, for "accidiospores" read "æcidiospores." Page 90, line 36, for "primrose" read "pruinose."

THE

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th December, 1894. Professor Baldwin Spencer, M.A. (vice-president), occupied the chair, and some 70 members and visitors were present.

REPORTS.

A report of the excursion to the Werribee Gorge, with a note on its geological literature, was received from Mr. T. S. Hall, M.A., and reports of the excursions to Warrandyte and Plenty River from Mr. D. Best.

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that the meeting for practical work on 26th November was devoted to taxidermy. Mr. G. A. Keartland, who directed the proceedings, stuffed and mounted several birds, the different operations being closely followed by some 26 members present.

ELECTION OF MEMBER.

On a ballot being taken, Master Albie Best was duly elected a member of the Club.

GENERAL BUSINESS.

The chairman announced that the Committee had decided that the subscription for members joining during the latter half of the year may be reduced to 7s. 6d., but in that case the *Naturalist* will not be sent unless separately paid for.

PAPERS.

1. By Mr. C. Frost, F.L.S., entitled "Note on a Snake new for Victoria."

This had reference to a snake received from Dimboola, which the author was at first disposed to regard as a variety of *Hoplocephalus nigriceps*, but which, on further examination, must be regarded as a new species; and a preliminary description of it was given.

2. By Professor Baldwin Spencer, M.A., entitled "Note on a Rare Marsupial from Central Australia."

This had reference to a marsupial of the family Dasyuridæ, of which specimens had been received, through the kindness of Mr. P. M. Byrne, from Charlotte Waters, Central Australia. They proved to be the rare form *Phascologale cristicaudata*, previously only known from a single specimen described by Mr.

Krefft under the name of *Chætocercus cristicaudata.* In seven specimens (all mature females) the last premolar tooth was absent on each side in the lower jaw, and in the upper jaw the last premolar was only present in one specimen on one side.

Specimens of the animal in spirits were exhibited.

NATURAL HISTORY NOTES.

A note was read by Mr. W. H. F. Hill on the occurrence of the rare skipper butterfly, *Hesperilla halyzia*, Hew., at Cheltenham. Four male specimens were captured flying in company with a number of males of *H. donnysa*, Hew., which it closely resembles in size and shape, and also in its great rapidity of flight. Two of the specimens were quite perfect, indicating that they had not come very far. The species is believed to be previously unrecorded from this part of the colony ; Mr. J. A. Kershaw, however, has specimens from Gippsland.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. A. Coles.—Pair of Painted Snipe, *Rhynchæa australis.* By Mr. C. French, jun.—Nest and eggs of English Linnet, containing an egg of the Pallid Cuckoo, collected at Albert Park. By Mr. C. Frost, F.L.S.—Snake, in illustration of his paper. By Mr. W. H. F. Hill.—Case of Victorian Hesperidæ, including *Trapezites iacchus*, Fab., *Hesperilla donnysa*, Hew., and *H. halyzia* (four male specimens from Cheltenham) ; *Trapezites dispar*, Kirby, and *Hesperilla donnysa*, Hew. (ovæ, larvæ, pupæ, and imagines), from Murrumbeena ; *Hesperilla picta*, Leach, and *H. ornata*, Leach, from Ringwood. By Mr. G. Lyell, jun., Gisborne.—Series of *Ialmenus myrsilus*, Doubleday, and *Palparia Lambertella*, Wing., bred specimens, both from Gisborne. By Mr. Jas. Mitchell.—Amazon Stone, or Microline (Potash Felspar), from Pike's Peak, Colorado, America ; Sphalcrite, or Iron Pyrites, Cockscomb (Quartz Crystals and Pearl Spar), from Cornwall, England ; and Stalactitic Quartz Crystals, with crystals of Stilbite, from Bombay, India. By Baron von Mueller, K.C.M.G. —*Drosera Whittakeri*, collected by Mr. Alex. Purdie at Mount Korong ; *Pimelia Husseyana*, discovered by Miss J. L. Hussey, near Port Elliot, South Australia, allied to *P. curviflora*, *P. dichotoma*, and some West Australian species ; and *Goodenia albiflora*, from South-Western Queensland. By Mr. G. E. Shepherd.—Blue Reef Heron, *Herodias jugularis*, and Barred-rumped Godwit, *Limosa uropygialis*, from Phillip Island.

NOTE.—*Re* Mr. Keartland's exhibit, recorded on page 110, only the eggs of *Polytelis Alexandræ* and *Emblema picta* were from Central Australia, the others being exhibited for sake of comparison.

After the usual conversazione the meeting terminated.

EXCURSION TO BAYSWATER.

Six members found their way to Bayswater by the 10.20 p.m. train from town on Saturday, 13th October. Of these two devoted their attention to the birds, while botany and entomology claimed the other members of the party.

Crossing the Sassafras Gully road at the gatehouse the party were soon at work in a well-timbered paddock which borders the railway line and runs down to the Dandenong Creek. In one of the trees near here a Great Kingfisher has its nest every year. The birds were noted, but had evidently not commenced laying. A little further on a White-shafted Fantail was noticed busily engaged in laying the foundation of its nest. Pardalotes, Acanthizæ, Sacred Halcyons were also noted here, and along the creek the Sericornis, Mountain Thrushes, and Thickheads were fairly numerous, though very few nests were found. The creek was now followed up as far as a ti-tree swamp, but with indifferent success. Nests were taken of the Superb Warbler and White-throated Thickhead, and several specimens secured for skinning purposes. In the swamp the little Emu Wren was seen, but as it was getting late no time could be devoted to a search for the nest.

The botanists of the party had by this time a fair collection of specimens, but the entomologists complained of indifferent success.

On returning to the station a little before 5 p.m. five other members were found awaiting our return, having arrived by the afternoon train and worked in a different direction. Owing to the limited time at their disposal, they had not much to show for the afternoon's walk, an Emu Wren and Short-billed Honeyeater being the most noteworthy specimens secured. The return to town by the 5 p.m. train concluded a very enjoyable, though not very profitable, outing.—W. Macgillivray.

EXCURSION TO SPRINGVALE.

The weather during the week ending Saturday, 27th October, was very unsettled, which will no doubt account for the small attendance at the excursion to Springvale fixed for that date, but those few who did put in an appearance had the satisfaction of spending a very pleasant afternoon. On arrival of the party by the 1.30 train from Melbourne they were met by the Rev. E. H. Hennell, who elected to proceed in a south-easterly direction from the station. The ground in many places was swampy from the recent rains, but these objectionable spots were easily avoided. From the large quantity of *Leptospermum scoparium* and Ti-tree, *Melaleuca squarrosa*, which was in flower, it was fully expected good results, especially in Coleoptera, would be obtained, but unfortunately, although both were most carefully

examined, the party were doomed to disappointment. Not a Longicorn was seen, and of Buprestidæ the only three noted were *Stigmodera macularia*, *S. octosignata*, and *S. octospilota*, and of these the first was the more numerous, about a dozen being taken. On the gum saplings were a few of a very common species of Curculio, and a limited number of a few varieties of Chrysomelidæ, of the genus Paropsis. For Hymenoptera the result was a complete blank, and the same might also be said of Lepidoptera, for of butterflies not more than six were seen, five of these being *Pyrameis Kershawii* and the other *P. itea*. A few small moths were taken, as were also some lepidopterous larvæ, but the names we are unable to supply. A fortnight later much better success would attend an excursion to Springvale, which has always been noted as a first-class collecting locality; and for next year we trust this suggestion will be acted upon; or, better still, arrange for a special excursion so soon as Mr. Hennell may advise the time to be opportune, which we feel sure he will be only too pleased to do. Orchids were also very scarce, only a few varieties being noted, amongst them being *Diuris longifolia*, *D. maculata*, and *Thelymitra aristata*.—D. Best.

EXCURSION TO TARRAWARRA.

The Club was fairly represented at the excursion to Tarrawarra, on the Healesville line, on Cup Day, 6th November, 1894. The party was favoured with splendid weather, and spent a most enjoyable day. We struck out in a northerly direction for the hills. The two geologists, however, decided to work in a different direction, meeting again in the evening. Just over the hill an Australian Pipit, *Anthus australis*, flew off its nest in a tuft of grass. The nest contained three eggs, but was left undisturbed, our photographer marking it for future operations. A little further along the boy was sent up a sapling after a White-throated Thickhead's nest, on which the male bird was sitting. The nest was found to contain young. All this time our entomologists were busy shaking trees and stripping bark, and, although rather early in the season, a few prizes rewarded their efforts, including the beetles *Tryphocharia*, sp., *T. hamata*, and a few Buprestidæ, also several larvæ and pupæ of Hesperidæ.

It was after noon when we arrived at the Maroondah aqueduct, when a halt was called for lunch. Shortly after starting again diversity was lent to the proceedings by the appearance of a large Tiger Snake, which, however, was soon despatched, and the head bagged. We soon reached the Steel's Creek valley, but as the timber was too stunted for good collecting we retraced our steps. The nest of a Yellow-backed Geobasileus was taken, in the hope that it might contain a cuckoo's egg, which proved to be the case.

The Geobasileus' eggs were nearly hatched, while the Bronze Cuckoo's was quite fresh. It is well known that the young cuckoo, when hatched, ejects the rightful occupants of the nest, but in this case the latter would have such a start that it is doubtful if the tables would not be turned. Some time ago I shot a Bronze Cuckoo which was carrying an egg in its mouth, and this is undoubtedly the means by which the egg is deposited in the small domed nests which are usually selected. We reached the station again about sundown, and in due course Melbourne, having had a most enjoyable outing.—H. P. C. Ashworth.

EXCURSION TO WERRIBEE GORGE,

With a Note on its Geological Literature.

On the 9th November an excursion was made to the Werribee Gorge, near Bacchus Marsh, by several members of the Club, two of whom turned their attention to ornithology. The geologists of the party were, however, augmented by fifteen members of the geology class at the Working Men's College, under Mr. G. B. Pritchard. We were met and guided by Messrs. Brittlebank and accompanied by Mr. Lidgett, and better exponents of the natural history of the district could not be found. The club is fortunate in having such able and willing members on whom to rely for guidance in such difficult country. As the report of a recent excursion to this locality will be found on page 54 of the present volume, it will be unnecessary to describe our day's outing more than by saying it was a most enjoyable one, and that the two lady geologists who accompanied us scrambled over the rocks and scaled the steep cliffs of the Gorge with, apparently, less difficulty than some of the other members of our party.

Probably the conglomerates and sandstones of Bacchus Marsh have had more written about them than any other of our deposits. The writings are scattered, and many of the earlier ones are difficult of access, and before any other papers are written on the subject it would be well for someone to collate the literature, and clear the ground for fresh work. One or two points have come under my notice in this connection which show how easy it is to overlook what has been done in the past, and how mistakes once made are liable to be perpetuated. We are told that Mr. R. Daintree was the first to ascribe the deposits to ice-action, that Selwyn adopted his views, and that Mr. E. J. Dunn was the first to prove their glacial character by the discovery of grooved and striated pebbles. Now it is more than likely that none of these statements is correct. First, with regard to the glacial character of the beds. The earliest mention of the beds that I have met with is one by

Selwyn in his Exhibition essay of 1861, and in this he uses the same words that he uses five years later in his better-known sketch of the geology of Victoria, ascribing the origin of the beds to "marine glacial transport." In 1863 Diantree's report, dealing with the district between Bacchus Marsh and Bass Straits appeared, and though in it he deals with the conglomerates at some length, he makes no mention of the peculiar arrangement of the beds, and does not deal with their probable origin. Three years later, in 1866, his report on the district of Ballan appeared, and was only handed in nearly two years after he had resigned his connection with the survey. In this, as is well known, he advocated the probable glacial origin of the deposit; so that the credit of the correct interpretation of the beds appears to be due to Selwyn. That the latter had long been considering the possibility of the occurrence of glacial deposits in Victoria, comparable to those which his previous experience on the English survey had made him familiar with, we learn from a report which he published in 1856, although up to that time he had not met with any evidences of such beds. In his 1861 essay Selwyn also states that the conglomerates are associated with the sandstones, generally towards the base of the series. It is evident, then, that Selwyn regarded the conglomerates and the sandstones as intimately related parts of the same formation, otherwise he would not have used the term "generally." At the Exhibition of 1861 we find that Selwyn showed photographs (taken probably by Daintree) of the junction of the deposit with the underlying Silurian rocks. Selwyn's route map shows that he followed the Werribee River from its mouth to its source, and it is not a little remarkable that he did not recognize any glaciated stones or rock surfaces.

With regard to the earliest find of striated pebbles, Selwyn in 1866 says that none had been found, and all subsequent writers have accepted his statement. In the same year, however, Daintree's oft-quoted "Report on the District of Ballan" was published, and its concluding words are :—" . . . . on the Lerderderg River, immediately below where that river leaves the ranges. Here I have found a few pebbles grooved in the manner I have read of as caused by glacial action, and here I believe fossil organisms will reward the explorer." So Daintree did find striated stones during his survey, and the only strange thing is that Selwyn and he did not recognize the character of the glaciated surfaces which occur.

With regard to the age of the beds, they were originally referred to Palæozoic age, and are so spoken of by Selwyn in his two Exhibition essays. Daintree, in his "Report on the District from Bacchus Marsh to Bass Straits," in 1863, speaks of them as of the same age, and refers the Grampian, Avon, Mount Tambo, and Macedon beds to the same horizon. In the

quarter sheet they are also called Palæozoic; but it is to be remembered that this map was "amended" before publication, after Daintree left the service. In his report on the Ballan district, in 1866, Daintree adopts Sir Frederick M'Coy's age of Mesozoic, and Sir Frederick now calls them Triassic. His reference is, however, not very generally followed, and the greater number of geologists consider them as of Permo-carboniferous age, and comparable to beds with marine fossils in New South Wales, in which glacial action is also evident.—T. S. HALL.

NOTES ON THE GENUS CALOCERA.

By HENRY T. TISDALL, F.L.S.

(*Read before Field Naturalists' Club of Victoria, 11th July, 1894.*)

ON the 30th May last an excursion was made by several members of the Club to Sassafras Gully, in the Dandenong Ranges. As the season was not very propitious for other pursuits, the members devoted their energies to collecting fungi. One of the younger members of the party, Master Norman Martin, a nephew of Mr. C. Frost, F.L.S., was fortunate in discovering what I trust may prove to be a new species of Calocera. In order to explain my reason for supposing that it may be a new species, I would like to state briefly, for the benefit of those members who have not studied this subject, the basis on which the classification of fungi is determined. In doing so, I shall only follow out the particular divisions that will lead up to this particular plant. The classification of the two main divisions is founded on the way in which the spores are produced. Any member who has handled fungi may have remarked that a quantity of fine dust falls from them. This is very noticeable in the common puff-ball, from whence a little cloud of such dust arises when the plant is disturbed. Each particle of this dust is a spore. The spores themselves are composed each of a single cell containing protoplasm and a nucleus. They are so exceedingly light that immense numbers float about in the air. Dr. Cooke remarks—"Recent microscopic examinations of the common atmosphere show that large quantities of spores are continually suspended." This fact is well known to good housewives who carefully cover up such substances as jam, &c., because they learn from experience that if they do not a plentiful crop of mould will soon appear—such mould being, in fact, a species of fungus springing from the lately-suspended spores, which have at last found their proper matrix.

To return to our classification, in one great division the spores are produced at the end of tiny branchlets, or they spring from ends or sides of very fine threads, and in various other

ways; but in all these cases the spore is produced free, or, as it is called, naked.

In the other great division, the spores are produced in tiny bags, called asci. An ascus is shaped like the ancient spindle—that is, cylindrical, but gradually decreasing to a point at either end. The asci generally contain eight spores, each placed side by side, and are thus, as it were, concealed, in contradistinction to the naked spores of the other division. Turning again to the naked spored division, we have the following groups:—

(1.) Hymenomycetes, when the hymenium or spore-bearing membrane is free, as in the common edible mushroom, where the hymenium covers the gill-like substance beneath the cup, or pileus, as it is called.

(2.) Gasteromycetes where the hymenium is at first enclosed in a fleshy bag as in the common puff-ball, which soon bursts, allowing the spores to disseminate. Before proceeding it would be well to explain exactly what the hymenium is. Imagine an exceedingly thin membrane from the one surface of which arises a great number of cells, exactly as a great number of plants of wheat may rise from the upper surface of the wheat field. Amongst these cells may be remarked small sterile cells, large sterile cells, and basidia. A basidium is a fruitful cell rising from the top of a short stem, and its growth will be explained more fully when describing the Calocera. This hymenium in the plants belonging to the Hymenomycetes covers the whole of the under surface of the pileus, whether that surface may consist of gills, or pores, or teeth, on an irregular but smooth surface, or it may cover the upper portion of the plant; but in the Gasteromycetes the membrane or hymenium is compressed in such a manner as you might crumple up a sheet of soft paper, and in this shape is placed within a cover or peridium. The other two groups of the naked spored division are distinguished by the hymenium being broken up into dust-like spores, with very few threads, or with very conspicuous threads bearing, comparatively speaking, few spores. Our subject only deals with the first group.

The Hymenomycetes contain four sub-orders which have the hymenium normally inferior, such as in the common Agaricus, where it is placed below the cap, or pileus. The Hymenomycetes comprises two other sub-orders, in which the plants have no pileus and the hymenium encircles the upper portion of each stem or branch, reaching in every instance to the apex. These two sub-orders are named Clavariei and Tremellini, and it is with these that our subject matter is closely connected. Those of our members who are in the habit of attending the field excursions must have observed beautiful coral-like plants of various colours—red, yellow, brown, or white; these are all different species of Clavaria. They are always erect, and, as their name implies, club-like in

shape; some are quite simple, but others are branched like a small shrub; they have no distinct stem. Except that the plants or branches swell out like clubs they have no particular shape, although many species retain their own particular system of branching. The hymenium is spread in a continuous web closely investing the whole of the branches; it is dry and homogeneous—that is, of the same nature as the rest of the plant. The substance of the Clavaria is generally firm, often tough. These plants are found in pastures, in woods, amongst grass, amongst moss, on sandy ground, amongst leaves, and on the ground generally; in fact, Dr. Cooke only mentions one Victorian species which grows on rotten wood. This fact shows in striking contrast with the genus Calocera, all species of which are parasite, and are always found growing on rotten wood, or on damp, partly decayed logs.

Tremella differ very much from Clavaria. They may be seen in almost any damp gully growing like lumps of jelly on decaying logs. The whole plant is tremulous and gelatinous, with the exception of the nucleus. Its form is almost brain-like, and it has the property of reviving when thoroughly moistened, although previously shrivelled and dry. Its jelly-like substance is pervaded internally with branched filaments, which terminate towards the surface in basidia; thus the whole surface is invested with the hymenium, which never rises into papillæ. The genus Calocera (the name is derived from *kalos*, beautiful, and *keras*, a horn), although it is placed in the sub-order Clavaria, partakes very much of the characters found in both the Clavaria and the Tremellineæ.

We may now return to our specimens, which were discovered growing on the under side of a decayed log in one of the dampest parts of the gully. I may remark that I found this species near Walhalla, about fifteen years ago, with exactly similar surroundings. But although I made a rough drawing of it I never described it, and I have never been able to find a specimen since. The specimens obtained in Sassafras Gully varied very much in size. One very fine specimen measured four inches, whilst the shortest was barely two inches. The first mentioned had a distinct stem nearly one inch in height and two lines through; it was cylindrical, but thickened towards the upper part. From the broad apex of this trunk arose four vertical branches. These branches, like the trunk, each widened towards the top, and from each broad top a further furcation ensued by the development of four more vertical branches. This peculiar branching was again repeated, so that this plant was altogether four times furcate. This process of furcation obtains amongst many of the Clavariæ, but only in an irregular manner, whereas in our plants this process is remarkably regular. All the branches are of a cylindrical shape—that is, if I can use the word cylindrical to a shape that increases towards

the apex. The tops of the uppermost branches were each surmounted by six to eight delicate processes, arranged in a vertical manner round the apex. A section of the trunk showed that the inside cartilaginous stem was surrounded by a thick gelatinous covering. This covering was continued over the whole plant, thus approaching very closely to the substance of the Tremellineæ.

The following description is taken from De Barry's "Morphology of Plants":—"The stem consists of rows of cells, all running nearly parallel to the longitudinal axis of the fungus. The transverse sections give circular or polygonal sections of the cells. The outermost of the three concentric layers of tissue which compose the stipes is in the fresh state of a viscid gelatinous consistence, and is formed of slender rows of thick-walled cells, which appear to be embedded in a soft homogeneous jelly." The spores of our Sassafras Gully specimens were white, elliptical, and slightly curved, which exactly agrees with Dr. Cooke's description of *Calocera digitata.*

The spores of Calocera are produced in the following manner :—From the surface of the thin membrane which completely covers the peculiar clavate form of the plant rise elongated cylindrical cells termed basidia. Each basidium is borne on a short thin stalk, and is much thicker towards the summit. At first it is filled with granular protoplasm ; when full grown, two slender branches called sterigmata spring from the broad apex, at the same time a kind of nucleus may be observed forming in the centre of the protoplasmic contents. As the sterigmata grow outward the protoplasm seems to rise upward, filling each sterigma, and leaving the base of the basidium empty. The ends of the sterigmata now begin to swell, and in a short time two fully developed spores are borne, one on each sterigma. I may remark that the spores of nearly all the Hymenomycetes are produced in the same manner, except that four sterigmata generally appear instead of two. I am sorry to say that I had not time to examine all the characteristics of this interesting plant whilst in a fresh state, so I determined to make a second excursion to the Dandenong Ranges to obtain a further supply. Unfortunately, I had an accident almost immediately after my arrival at the gully, and had to return without a single specimen.

The species which approaches nearest to ours is *Calocera digitata*, and as far as I have been able to judge it differs in the following characters :—

	Calocera digitata.	Sassafras Gully specimens.
Height ...	1 to 1½ inches ...	2 to 4 inches
Colour ...	Pallid	Yellowish brown
Furcation ...	Twice	Three or four times
Branches ...	Apex spathulate ...	Apex cylindrical
Processes ...	3 to 5	6 to 8

We find, therefore, that our specimen differs in five characters. It is nearly twice the height; its dark yellowish brown colour contrasts strongly against the pallid shade of the *C. digitata.* The difference in the furcation is not so evident as in some specimens; it agrees with Dr. Cooke's species. The most important characteristic differences lie in the shape of the upper portions of the branches, and the number of processes on the apex of each. The *C. digitata* is especially shown to have spathulate branches, whilst our specimens are all cylindrical; and the five processes which give the name to the *C. digitata* are increased in ours to seven or eight. Still I am uncertain, and would wish to obtain more specimens before asking Baron von Mueller to submit the whole question to Dr. Cooke.

A Phosphorescent Ostracod.—While bathing at Brighton beach on a calm hot night about three weeks ago, I noticed a considerable amount of phosphorescent light. It occurred when the water was agitated, and flashed out from distinct points, each apparently about the size of a threepenny piece, the movement made by the hands while swimming causing the light to shine out in a striking manner. Walking along the beach afterwards, the light was found to proceed, apparently, from animals washed on the sand by gentle wavelets. These only rarely showed any light until the ground was trodden near to them, when they at once shone out brilliantly. A bottle was obtained and a considerable number was secured by taking up with the fingers a little of the sand showing luminosity. On washing the sand off in the bottle the animal swam about very rapidly, leaving behind it a trail of light which sometimes was very bright indeed. On reaching home the bottle was found to contain a quantity of a form belonging to the Ostracoda. Not being aware that this group included animals exhibiting phosphorescent phenomena, I had to satisfy myself, after vainly looking for another source, that this animal was the cause by laying one of the animals on my hand and going into the dark, when it was easy to produce the light by pushing the animal about with the finger. Placing one under the microscope, and turning down the lights, it could be examined as a self-luminous object. I could not certainly determine the source of light, but it commenced to glow about the anterior of the animal, though it would spread, if sufficiently irritated, until the whole of the body was luminous. Apparently a substance luminous and cloud-like spread through the water, though nothing could be seen when examined in the ordinary way with a fairly high power. A dozen or so in a little water, when shaken, emitted sufficient light to read a watch-dial.—J. Shephard. Brighton, 12th November, 1894.

ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Proceedings of the Linnean Society of New South Wales*," 2nd series, vol. viii., part 4 :—

"The President's Address," by Prof. E. David, B.A. Contains a sketch of the present knowledge of the geological history of Australia, Tasmania, and New Zealand.

In "*Transactions of Royal Society of New South Wales*," vol. xxvii., 1893 :—

"Unrecorded Genera of the Older Tertiary Fauna of Australia, including Diagnoses of some New Genera and Species," by Prof. R. Tate, F.G.S. Contains references to and descriptions of several Victorian species.

In "*Proceedings of the Linnean Society of New South Wales*," 2nd series, vol. ix., part 1 :—

"On Nests and Habits of Australian Vespidæ and Laridæ," by Walter W. Froggatt. Contains references to several Victorian species.

"Notes on Australian Coleoptera, with Descriptions of New Species," part xv., by Rev. T. Blackburn, M.A. Contains notes on several Victorian species.

"On Life-Histories of Australian Coleoptera," part ii., by Walter W. Froggatt. Contains life-histories of several Victorian species.

The Rosehill Parrakeet (*Platycercus eximius*).—While on a collecting trip to the Werribee I noticed a Rosehill Parrakeet fly from an old nest of the Temporal Pomatostomus, and on climbing the tree and looking into the nest I was surprised to see six eggs of the Rosehill Parrakeet, which were quite fresh. While blowing the eggs near the nest, the bird kept flying from tree to tree uttering its screeching note. Mr. A. J. Campbell says he has not heard of the Rosehill Parrakeet building anywhere but in hollow trees, but Mr. J. Gabriel informs me that he made a similar discovery this season.—C. French, jun.

The Butterfly Pamphila augias, Lin., in Victoria.—Mr. H. Giles, in March last, captured two specimens of this well-known "skipper," which, however, has not been previously recorded from Victoria. It is hoped that further captures may be recorded by our entomologists this season. This capture further extends the wide area over which the species is known to occur, ranging from India and Ceylon throughout the Malayan Archipelago, and southward to our own colony.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held in the Royal Society's Hall on Monday evening, 14th January, 1895. The President Mr. H. T. Tisdall, F.L.S., occupied the chair, and some 90 members and visitors were present.

REPORTS.

Reports of the excursion to Heidelberg and of the camp-out at Phillip Island were received from the respective leaders, Mr. J. Shephard and Mr. H. P. C. Ashworth.

PAPER.

By Messrs. H. P. C. Ashworth and D. Le Souëf, entitled "Albatross Island and the Hunter Group."

During a recent visit to these islands the authors were enabled to land on Albatross Island, which had not been visited for 25 years. The island was first discovered by Bass and Flinders in 1798, and then received its name from the fact that it was covered with brooding Albatrosses. The trip was undertaken in the hope that these birds would still be found there, and this proved to be the case. They were identified as the Shy Albatross, *Diomedea cauta* —the nidification of which was previously undescribed—and were found sitting on their nests, in large numbers, at the edge of the cliffs. The island was found to be a mass of quartz conglomerate, intersected by softer strata, which have been much eroded by the waves, forming large caves. In one of these the authors were obliged to live for six days, a gale preventing the cutter from approaching. When at last they got off their boat was swamped, causing serious loss to one of the party. Subsequently they visited Penguin Island and secured some interesting photographs of the Pelican rookery which is found there. The paper was illustrated by a beautiful series of limelight views, shown by Mr. J. Searle with his usual skill.

NATURAL HISTORY NOTE.

A note was contributed by Mr. G. E. F. Hill commending the protection of the Frilled or Dew Lizard to vignerons as being the only living creature which destroys the caterpillars of the Vine Moth.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. E. Anderson.—Victorian form of the moth *Spilosoma glatygni*, for comparison with form from Albatross Island. By Mr. H. P. C. Ashworth.—Photographs from Phillip Island excursion. By Messrs. H. P. C. Ashworth and D. Le Souëf.—Shy Albatross, *Diomedea cauta*, with nest and eggs, from Albatross

Island; mounted birds, birds' eggs, and photographs from Hunter Group. By Mr. A. Coles.—Nest and eggs of Frontal Shrike-Tit, *Falcunculus frontatus*. By Mr. F. J. Ellemor.—Female lizard, *Grammatophora muricatus*, exposing oviduct containing eggs. By Mr. G. E. F. Hill.—Living specimens of the lizards *Gymnodactylus miliusii* and *Amphibolurus barbatus*, from Ararat. By Mr. J. A. Kershaw.—The following rare Lepidoptera:—*Hepialus Ramsayi*, Scott, from Queensland; *H. daphnandræ*, Luc., from Queensland; *Hypochrysops hecalius*, Misk., from Gippsland; *Holochila Heathii*, Cox, from Gippsland, with eggs and pupa; *Calamidia hirta*, Meyr., from Gippsland; also a Bot Fly, *Gastrophilus (Œstrus) salutaris*, Clark, with eggs, taken off throat of horse in Carlton. This is different to the common English Bot Fly, *Œstrus equi*. By Mr. James Mitchell.—Thirteen mineral specimens, showing twin or macled crystallization, comprising:—Barite, from Cumberland, England; Albite, from Switzerland; Iron Pyrites, from New South Wales; Cerusite, from Broken Hill; Lime Stalactite, from New Zealand; Copper Pyrites, from Mexico; Azurite, from Mt. Hope, New South Wales; Phillipsite and Phacolite, from Melbourne; Quartz Crystals, from South Australia; Fluor Spar, from Derbyshire, England; Calcite, from England. By Mr. C. French, jun.—Eggs of *Milvus affinis*, from South Australia. By Baron von Mueller, K.C.M.G.—*Nymphæa cœrulea*, new for New South Wales. By Mr. G. Shepherd.—Nest and egg of Lineated Warbler, *Cisticola lineocapilla*.

After the usual conversazione the meeting terminated.

ALBATROSS ISLAND AND THE HUNTER GROUP.

By H. P. C. Ashworth and D. Le Souëf.

(Read before the Field Naturalists' Club of Victoria, 14th January, 1895.)

The Club expeditions to the islands of Bass Strait have been among the most successful carried out under its auspices, and in the successive trips to King Island, Kent Group, and Furneaux Group have added materially to our knowledge, both of their physical features and of the distribution of their fauna. The splendid results achieved have been due in no small measure to the ornithologists, who have certainly been the most enthusiastic supporters of these excursions. The descriptions of the breeding habits of the sea-birds throughout the Strait have been of especial value. To complete this work there remained, however, one important island to visit—we refer, of course, to Albatross Island, perhaps the most interesting of all, for did not Bass record, nearly a century ago, the fact that it was covered with brooding Albatrosses? Although many eyes have been turned towards it of late years, few have essayed the task of landing on its rocky shores, and up to the time of our visit none had succeeded. It is the westernmost of the Hunter Group,

"Crisp Photo" Process. *Negative by H. P. C. Ashworth.*

"WHERE THE PELICAN BUILDS ITS NEST."

and is situated about twenty miles from the extreme north-west of Tasmania. The Group was discovered by Bass and Flinders in 1798, during the memorable voyage on which Bass Strait was proved to exist between Van Diemen's Land and New Holland. After rounding the end of the West Hunter, they set out to a rocky islet to the westward, which excited their curiosity owing to the top being white with sea-birds. Here Bass landed, while Flinders stood off and on in the ship, but so strong was the current that he was carried some five miles away, and Bass had great difficulty in rejoining him. He reported that after fighting his way through the seals which lined the cliffs, he had arrived at the top of the island, which he found to be covered with Albatrosses sitting closely on their nests, and pecking at his legs as he passed by, so that he had to force a passage through them with his seal club. The islet received the appropriate name of Albatross Island. The current, too, was hailed with delight, for the flood came from the westward, indicating the existence of the passage of which they were in search. Doubtless the early sealers sometimes landed on the island, but the only visit of which we could get any certain information was 25 years ago, when some guano traders worked there for a time, but eventually abandoned it when their boat was dashed on to rocks at the landing-place, and they had to subsist on Albatrosses till rescued. Our main object, then, in visiting the Group was to attempt a landing on this island, and to procure the eggs and identify the species of albatross. We were fortunate in securing the services of Captain C. Mullins, who landed with the guano traders before referred to, and embarked with him on the fore-and-aft schooner *Martha* at daylight on Thursday, 15th November, bound for Circular Head. After wearily waiting till about 3 p.m., we are towed down to Williamstown to await a favourable breeze. During the night we get under weigh, and at noon we anchor off Queenscliff, the wind having gone round to the south. Our patience is now sorely tried, for the wind freshens into a south-west gale, and it is not till five days afterwards, on the morning of Wednesday, the 21st, that, tired of waiting any longer, we go out through the Heads, the wind having abated slightly. There is still a heavy sea, however, which puts us somewhat *hors de combat*, but we soon recover, and with more favourable winds arrive at Stanley on Friday morning.

During the voyage bird life was not entirely absent. Several specimens of the White-faced Storm Petrel were seen, while the beautiful little Dove-like Prion constantly followed in our wake. An intelligent fisherman at Queenscliff informed us that both these birds are breeding on Mud Island, in Port Phillip. Outside the Heads the Albatrosses began to appear. The Great Wandering *(Diomedea exulans)* was the first kind seen, then a few representatives of the Sooty Albatross *(D. fuliginosa)*

appeared; but by far the commonest was the Shy Albatross *(D. cauta)*. At one time we amused ourselves "fishing" for them (to use an Hibernicism) with a piece of fat on a Barracouta line. Although several were hooked, we did not succeed in "landing" any. We were more successful with the Barracouta, however, four fine fish being caught just off Three-Hummock Island.

LANDING AT STANLEY.

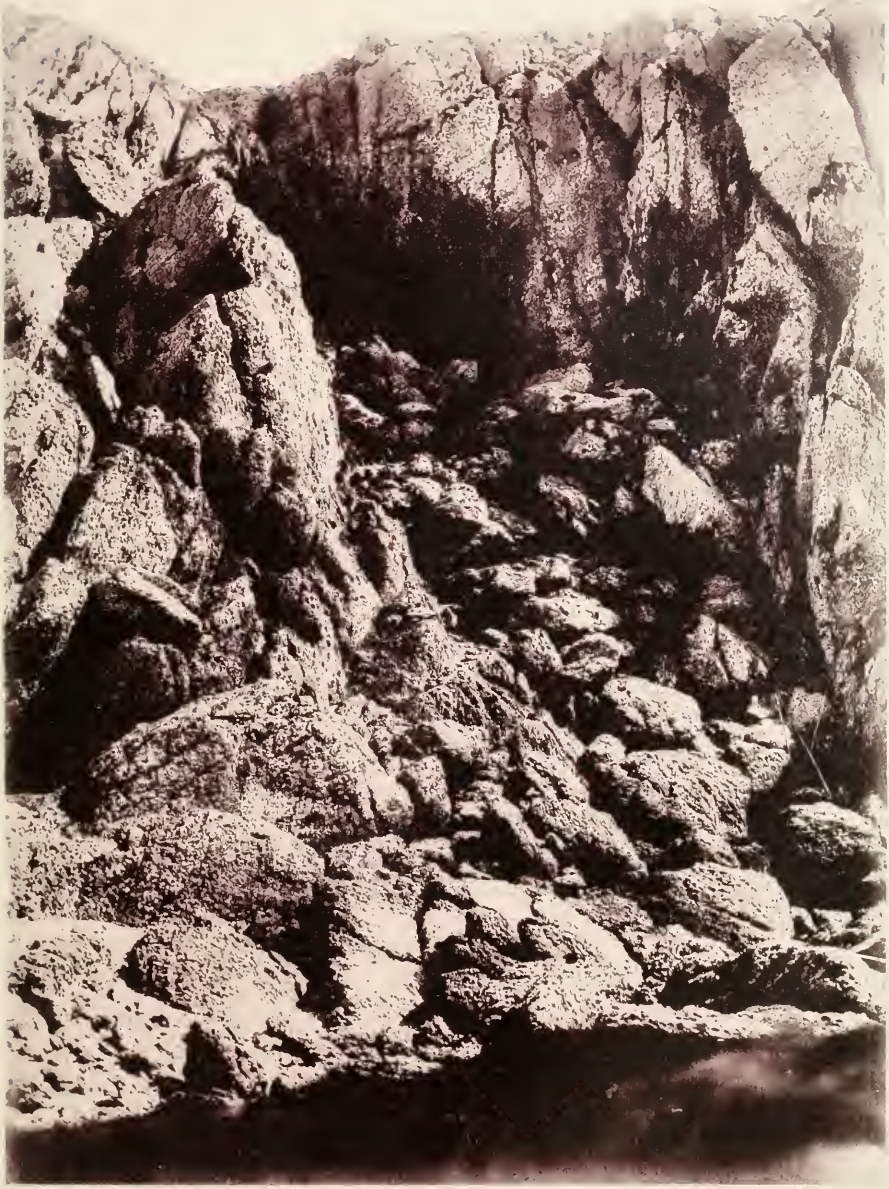
Sailing around the Circular Head into Stanley, our first impressions of Tasmania are decidedly favourable. Circular Head (or "The Nut," as it is locally termed) is a flat-topped rocky mass, nearly 500 feet high, one-half of whose circumference is washed by the sea, and around the other half of which Stanley picturesquely nestles. On landing, the first thing which strikes us is the great number of small blue crabs with which the sand at low tide is covered. Convict prisons and stores, reminding one of former days, line the shore, while behind is the quaint and old-fashioned township. The next two days are spent here, while the cutter *Marthine*, in which we are to visit the islands, is got ready for sea. We ascend "The Nut," where several Black-cheeked Falcons' nests are seen on the cliffs above the sea, but far out of reach. To the north is a long reach of sand dunes, which are encroaching on the land at so rapid a rate that the people became alarmed, and are now planting the Marram grass, which has proved so successful in stopping similar encroachments at Warrnambool, and the introduction of which we owe to Baron von Mueller; it is thriving well, and will no doubt prove effectual here also. In one place the removal of the sand has exposed a large number of blackfellows' middens, or heaps of broken shells, with the sharp stones used for breaking them. This beach was evidently much resorted to for shellfish by the Tasmanian aborigines. A complete skeleton was revealed by

the shifting sand, some time ago, and scared a passer-by, who took it for a ghost. The skull is in the possession of a resident, and as a relic of the lost Tasmanian race it is of some value.

On the morning of the 25th we make a start for the islands, having decided to land on Albatross Island at the first opportunity, and then to do as many of the other islands as we can in the now limited time at our disposal. A fair wind favours us, and such good progress is made that we land shortly after noon on Three-Hummock Island. The afternoon is spent in wandering along a sandy beach, where the eggs of the Black-fronted Dotterel and the White-breasted Oystercatcher are taken. In the evening we go up to Mr. J. Burgess's farm, where we receive a hearty welcome. A description of the ascent of the highest of the Three Hummocks will be found in a paper read by our well-known honorary member, Mr. E. D. Atkinson, and published in vol. vi. of the *Victorian Naturalist*. With regard to the absence of Wallaby on this island, noted by Mr. Atkinson as a curious feature, we learn that their extinction must have been very recent, as their bones are found in great numbers. There is a small Mutton Bird rookery on the island, the favourite resort of the farm pig, which roots the birds out and eats them. We are told that the Reef Herons are fairly numerous on some of the smaller islands, and also eat the young Mutton Birds.

We elect to sleep on shore, and at 5 o'clock next morning are awakened by Captain Mullins with the good news that the weather is favourable for landing on Albatross Island. We are quickly dressed and row off to the cutter, which immediately sets sail, heading for the northern extremity of the West Hunter. Here we pass through a potboil and out into the ocean. Six miles to the westward Albatross Island looms up against the horizon, but almost shut out from view by a heavy mist. As we get nearer the mist clears away, and its jagged outline, constantly changing as the veering wind takes us far to the northward, stands out in bold relief. Fortunately we are enabled to beat down before the tide turns, and about noon drop the kedge and hang on to the kelp at the base of a gorge leading down to a sheltered cove. Here we manage to jump on to the rocks from the dingey, and then, with some difficulty, owing to the heavy surf, catch our various effects as they are thrown to us from the boat. We land also a keg of water—a provision for which we are afterwards very thankful, for none is found on the island. We are so enchanted with the romantic appearance of the island that we give instructions to Captain Mullins to leave us two days, in order that we may thoroughly explore it; he then takes his departure in the cutter, seeking an anchorage inside the West Hunter. Our first care is for the inner man; then with our cameras on our shoulders we set

out on a voyage of exploration. At the head of the gorge we come to the entrance to a large cave or tunnel, upwards of a hundred yards long and 40 feet wide. Passing rapidly through to the other end we find ourselves looking down on a deep gorge strewn with huge boulders and lined with rugged cliffs, extending right across the island. In line with the first cave, but high up on the other side of the gorge, is the entrance to a second cave, with a spot of light in one corner indicating the exit at the other end, as seen in illustration. Curious to see where it leads to, we scramble across the gorge, crawling under the boulders where we cannot get over them, and at last reach the cave. There is evidence that the guano traders lived here in the shape of cooking utensils so rotten that they crumble when touched. The floor of these caves is composed of guano and strewn with the bones of seals and such large numbers of Albatross bones as to excite our wonder: in one heap alone, sifted out by the guano traders, there must have been the bones of several thousand birds. They could hardly have been destroyed in such numbers by the sealers; possibly the birds have for centuries sought the darkness of the caves in which to die. The guano we found to be perfectly dry; some which had been stacked in bags twenty-five years before was perfectly intact. The whole island is composed of a quartz conglomerate, probably of Palæozoic age, and of such hardness that the terrible surf seems to have but little effect on it. The rock is in many places intersected vertically by softer strata, which are much eroded by the waves. The caves have apparently been formed in this manner when the island was much lower. It seems to be certain that the whole island is rising, for the bottom of the deep gorge, which extends across the island, is stated by Captain Mullins to have been covered at high tide, whereas now it is some 30 feet above. On the chart, also, two islands are shown, and the height given as 120 feet, while our aneroid registered nearly 150 feet. On passing through the second cave we find ourselves in a hollow in the centre of the island; climbing up the side of this we at last arrive at the top of the island. Here the scene is of surpassing grandeur and impressiveness. The rock juts out all over the island, often in the most fantastic shapes, festooned with flowering mesembryanthemum and wild geranium, the only other vegetation being tussock grass and the fern *Asplenium marinum*. The wind has freshened into an easterly gale, and the surf dashes up the cliffs sixty or seventy feet, while the whole air is laden with spray. We do not pause, however, for our attention is riveted by a number of white forms on the edge of the cliffs. With a shout of delight we make our way thither, and find that which we have risked so much and come so far to see—the breeding place of the Albatross.



"Crisp Photo" Process. *Negative by D. Le Souef.*

GORGE AND ENTRANCE TO CAVE, ALBATROSS ISLAND.

Perhaps it will be well, before we go any further, to briefly review the special points of interest connected with this group of birds, scientifically known as the Diomedeæ. They are, then, essentially pelagic in their habits, and are found principally in the southern seas. Stray specimens have been seen as far north as Norway, but this is only evidence of their wonderful powers of flight. They are nocturnal as well as diurnal, and have been known to follow ships for weeks together; indeed, Gould is of opinion that they must often perform the circuit of the globe. The flight of the Albatross has always excited wonder and admiration. With its enormous stretch of wing it has brought the science of soaring to perfection—the fiercer the gale the more motionless are its wings, and the more easily does it circle around, gracefully topping the billows. Professor Hutton's theory that in soaring flight the wings are inclined upwards in the direction of flight, although often adversely criticised, is nevertheless the most feasible so far advanced. Recent experiments have shown that the negative pressure on top caused by rarefaction of the atmosphere plays an important part in supporting the bird. It seems likely that this pressure combines with the upward pressure underneath to balance the force of gravity, leaving the momentum to be utilized to the best possible advantage. It is worthy of note that the aëroplane flying machine—the latest product of the inventive genius of Mr. Hiram Maxim, and the only machine which has ever actually risen from the ground—is constructed on a similar principle. Mr. Maxim's experiments have shown clearly the great advantage of driving an aëroplane on to new air, the inertia of which has not been disturbed, and that at high speeds the lifting power is much greater than it was thought to be.

Until an Albatross has acquired the necessary momentum it is quite helpless, so that it cannot rise from the land unless it goes to the edge of a cliff, and, in descending, gains the necessary impetus. It rises from the water by dint of much flapping of its wings and running on the surface with its broad-webbed feet. To alight it is necessary to destroy the momentum. This is effected by inclining its whole body to the wind, and with legs stretched out and head thrown back it then presents a most ungainly appearance.

The breeding habits of the Abatrosses are little known, for they haunt only the most isolated rocks. On Tristan da Cunha, Prince Edward Island, and the Auckland and Campbell Islands, the Wandering, Culminated, and Sooty Albatrosses are known to breed, but we were in hopes that another species would be found on Albatross Island. Nor were we disappointed, for the species proved to be the Shy Albatross (*Diomedea cauta.*) This is a beautiful form, with a snow-white crown and delicate grey cheeks and neck. The stretch of wings is about eight feet.

BROODING ALBATROSSES

Scattered along the cliffs in various places there must have been some 400 nests of these birds. The nests were raised structures of earth intertwined with roots and grass, varying in height, according to age, from 6 inches to a foot. The concavity is about 12 inches diameter and 5 inches deep. They are placed directly on the rock, and are evidently used for a great number of years. In the decayed interior of the nest two species of earthworms were discovered, which Professor Spencer is disposed to regard as new. Most of the nests contained a single young bird, clothed in white down and with a black beak, but in a few the single egg had not yet hatched. The egg is about 4 inches long by 2¾ inches wide, of a creamy white colour, and marked at the larger end with red surface spots, in some cases forming a well-defined zone, in others evenly distributed. Both birds share in the task of incubation, and the sexes are indistinguishable. They sit very close on the nest, and we found it necessary to catch the bird by the bill with one hand while the egg was abstracted with the other. In endeavouring to alight the birds were often unsuccessful, and had to soar away and come up against the wind for another try.

When a bird wishes to go to the edge of the cliff to fly away it has to run the gauntlet of the sitting birds, which cackle and peck at it viciously. It stretches out its neck, cackling in return, as much as to say "Let me pass." The cock bird is very affectionate, spreading his tail and preening the feathers of his mate lovingly. When irritated the birds will disgorge an oily-looking fluid at an intruder, at the same time separating the feathers of the head so as to show an orange membrane running along the cheek from the base of the mandibles, giving it a more formidable appearance. When being fed the young put their heads right inside the bills of their parents, who then disgorge their food. In one place,

some distance down the cliff, the White-breasted Cormorant (*Graculus leucogaster*) was nesting in company with the Albatrosses, their nests being in some cases not more that 2 feet away from those of the Albatross. Having photographed this wonderful scene in all its phases, we start on our return, for it is getting late, and the tent has to be erected before nightfall. This accomplished, we turn in, but during the night the wind blows up the gorge with such force that, fearing that the tent would be blown down, we take our blankets and seek refuge in the cave, but not to sleep, for the Penguins, with which every crevice is tenanted, keep up a perfect pandemonium the whole night through.

In the morning an easterly gale rages fiercely. We take several fine instantaneous views of breakers rolling into our landing-place. A pair of White-breasted Sea Eagles are circling overhead; their nest is found on the cliffs at the head of the gorge, but the young have flown. The day is spent in exploring the other end of the island. After passing through the first cave our attention is drawn to a pair of Black-cheeked Falcons, whose agitation betrays the existence of their nest high up on a ledge of rock. On reaching it we find one addled egg; a fully-fledged young one—probably the other occupant—is flying about.

After much climbing down crevices and through gorges where huge boulders are piled in endless confusion, we reach a high rocky promontory at the south of the island, where we rest to admire the view. To the southward Cape Grim, with its attendant islets, is dimly seen; eastward is the long low shore of the West Hunter, surf-beaten; while far to the westward the Black Pyramid rises precipitously from the expanse of the ocean. Although distant 16 miles, a large white area, which we are assured is caused by birds—probably Gannets—is plainly discernible. It is certain, from the large number of these birds seen throughout the trip, that a gannetry, much more extensive than that seen on Cat Island in the Furneaux Group, is in the vicinity. We were informed that two sealers were once left on the Black Pyramid by a passing whaling vessel, which then left and was not afterwards heard of. When rescued, some time afterwards, one had just died of starvation, and the other was meditating a meal off him. Near the end of the promontory we stop to photograph a nest of the Pacific Gull containing two eggs. In the ground under the tussocks the beautiful Dove-like Prion (*Prion turtur*) is found in numbers, each sitting on a single white egg. We disturbed a crow which was eating one of these little birds, after having already demolished its egg. On the way back to camp we called in at the Albatross rookery, which we were never tired of watching, and took a few more photographs. The afternoon was spent in the cave, skinning birds and packing up in readiness for our expected departure on the morrow.

The cave proved so convenient that we set up the tent inside, and so tired were we that we slept soundly during the night in spite of the Penguins.

The morning of Wednesday, the 28th, broke clear and fine. From the top of the island we keep a good look-out for the cutter, but the day passed without a sign of her. A Brown Quail *(Synoicus australis)* was picked up, which must have come a long distance, for it was unable to fly. The butterfly *Pyrameis itea* flitted about, and was the only kind seen. Large numbers of a dark hairy caterpiller were found. One was placed in a tinful of guano, and was not opened till the 6th January of this year. It had turned into a chrysalis, and later on the same day the perfect insect emerged and proved to be a dark form of the moth *Spilosoma glatygni*.

Two lizards were met with on the island, viz., *Liolepisma pretiosum* and *L. trilineatum*, both common to Victoria and Tasmania. The Planarian *Geoplana Sugdeni* was also noted.

At dusk it was our wont to watch the Penguins come in from the sea. There is a heavy surf in the cove, and we are anxious to see how they land. They appear first some distance out, swimming slowly about in shoals of about fifty; then, waiting their opportunity between the breakers, they would all start for the shore at a great rate, diving and reappearing in rapid succession, then splashing through the kelp they would struggle on to the rocks, sometimes using their rudimentary wings to gain a holding. Several such companies will assemble on one large flat rock, until there are 400 or 500 birds. Then one will make a start along one of the various well-defined tracks, and the rest follow in single file. Up to the present the only sound has been the splashing as they land; but when the birds rejoin their mates it is made evident that they have not come on shore to sleep, still less let others sleep, for a discordant row begins, which lasts the whole night long. In the cave in which we had taken up our abode they were in hundreds, walking about and paying visits, and keeping up the following performance:—First one would utter a high shrill note, then followed a long-drawn squawking chorus, the process being repeated *ad infinitum*, and, let us add, *ad nauseam*.

On Thursday, the 29th November, we paid a visit to a large rookery of Silver Gulls *(Larus Jamiesoni)* on the west side of the island. The nests were situated between the tussocks springing from the clefts in a rocky headland, and contained two to three eggs or young. The birds were much less wary than

usual, and some fine photographs of them hovering over the nests were secured.

On regaining the summit of the island we descried the cutter far to the leeward, and immediately hurried down to the cave to strike the tent and pack up. Imagine our dismay when, on going up to the look-out an hour later, the cutter had entirely disappeared. Completely puzzled, we retraced our steps to the cave, and it must be confessed, became rather anxious. The next day passed without a sign of the boat, and things were beginning to get serious. Our bread, brought from Queenscliff, was some ten days old, and a trifle hard, our tinned provisions had given out, and we had only a bag of flour to fall back upon. Water, too, had to be doled out in allowances. However, all our fears were dispelled on Saturday morning, 1st December, for on rising we were overjoyed to see the cutter close by. Everything is ready by the time she has beaten in. Captain Mullins comes off in the dingey, and one load is got off safely to the cutter. Our second venture is not so successful. Just as everything is in and we were pushing off, a heavy backwash left the bow of our boat stranded on a hidden rock; the next wave poured in astern and instantly swamped her. One of us managed to scramble on to the rocks, while the others hung on to the boat and succeeded in passing the painter ashore. Had another big wave followed we would undoubtedly have been dashed on the rocks; fortunately, however, a lull occurred, enabling us to partly empty the dingey. Captain Mullins, who throughout this trying experience had displayed admirable coolness and courage, jumped in and baled the water out with his hat. He then set to work to pick up the luggage which had floated off in all directions. This was nearly all secured, the most serious loss being the photographic plates which had been exposed by Mr. Ashworth on the island. It was impossible to recover these, as the cutter was drifting ashore. Reluctantly leaving them, we got off to the cutter without further accident, and after a rough passage across to the West Hunter, we beat down to Shepherd's Bay, where we anchored for the night. We now learned that the cutter, after we had sighted it on the previous Thursday, had been carried right back by the current, and only with difficulty fetched the Three Hummocks.

On 2nd December we make an early start and run down to Penguin Island, on which the Pelicans are known to breed. On landing we find progression difficult, the ground being riddled with Mutton Bird holes and covered with thick saltbush. On reaching the eastern point of the island the Pelicans are sighted, but have to be photographed from behind a rock some distance off. On going closer the birds fly out to sea. The nests are formed on the sandy soil of seaweed and twigs of saltbush lined with grass, three feet or more in circumference, and with a concavity fourteen inches in diameter and two to three inches deep.

They are mostly occupied by young, and very grotesque little creatures they are, being born quite blind and naked. Some of them are engaged in crawling about, digging their bills into the sand to help themselves along. One comparatively large bird has to be separated from a younger one, which he has pecked at until its back is covered with sores. A few of the nests contain eggs, two in number, and in others the young are just emerging from the shell. Close to the rookery a nest of the Pacific Gull is seen, containing two eggs, and a little further on a Blue Reef Heron flies out of a rocky pinnacle. On scaling it the nest is found, containing four fresh eggs.

Leaving this interesting island, we have a fine run back to Stanley, and arrive late at night. Next day we start on our return to Melbourne, being some days overdue, but satisfied that the results of our trip more than compensated for the perils and inconveniences we had undergone.

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., LL.D., F.R.S.

(Continued.)

Didiscus Croninianus.

Trachymene Croniniana, F. v. M. coll. Annual, erect, but comparatively dwarf, beset with scattered spreading somewhat rigid hairlets; radical leaves slit into rather narrow partly incised lobes; upper leaves few-lobed; umbels comparatively small, some of them only short-stalked; involucral bracts mostly about as long as the pedicels; petals white; one of the fruitlets only developed, prominently wrinkled, the free portion margined by a narrow membrane.

Towards Coolgardie; Cronin.

Tallest specimens obtained only about 8 inches high, some flowering at half that height. Largest leaves measuring hardly above 2 inches. Longest pedicel fully ⅓ inch long. Petals about $^1/_{16}$ inch long. Anthers whitish. Fruitlet hardly $^1/_{10}$ inch long, and less broad; the rugosity on each side forming usually three irregular longitudinal ridglets, the asperity scanty only.

Nearest to *Trachymene* or *Didiscus elachscarpus*, but much larger in all its parts, and the fruit-ridglets somewhat membranously edged—a characteristic not otherwise occurring in the genus.

Regrettably the name Didiscus became by some writers during late years discarded in favour of that of Trachymene, a procedure which involved the re-naming of all the formerly acknowledged Trachymenes as Sieberas—disturbing a nomenclature in force for phytography and horticulture during more than half a century. The species of Didiscus are probably all deleterious, as recently demonstrated by cases of poisoning of pasture-animals, when feeding on *D. pilosus* and *D. glucifolius*.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 11th February, 1895. The president, Mr. H. T. Tisdall, F.L.S., occupied the chair, and there were present some 40 members and friends.

REPORTS.

A report of the excursion to Williamstown, on 9th February, was received from the Rev. W. Fielder, who acted as leader on the occasion.

PAPER.

By Mr. H. T. Tisdall, F.L.S., entitled "Walhalla as a Collecting Ground."

This district was recommended by the author as one of the best collecting places in Victoria. The township itself is situated in the narrow valley of a tributary of the River Thomson, hemmed in with the Gippsland mountains on either side, and is best known from the great richness of its gold mines. The different routes to it were mentioned, and the vegetation to be met with along them graphically described, and, as the result of a recent trip in search of cryptozoic fauna, much information on the distribution and habitat of Planarian and Nemertine worms was given. The paper was illustrated by drawings of most of the species of Planarians described.

Some discussion ensued, in which Messrs. Prince, Barnard, Frost, and Ashworth took part, Mr. Prince referring especially to the very interesting geological features of the district.

NATURAL HISTORY NOTE.

An interesting note was read by Miss. S. W. L. Cochrane on the effect of a strong north wind carrying insect life out to sea on the eastern side of Port Phillip Bay. When the wind changed the shore was found to be lined with immense numbers of drowned and dying beetles, dragon flies, &c.

VISITOR.

The Rev. W. Howchin, F.G.S., of Adelaide, was introduced to the meeting by the Rev. G. Rammage. He was cordially welcomed by the president, and in responding gave a brief account of his researches for some years regarding the distribution of recent and fossil Foraminifera, which had resulted in the addition of a large number of species to the Australian list, and which had been described before the Royal Society of South Australia.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Miss S. W. L. Cochrane.—Shells, &c., from Carrum. By Mrs. Flatow.—Collections of Land and Marine Shells. By Mr. C. French, F.L.S.—Rare Sphingid moths from North Queensland, viz. :—*Macrosita severina*, *Chærocampa* (n. sp.), *Cizara ardenia*, *Cizara* (n. sp.), and *Sesia* (n. sp.); also Buprestid beetles new for Australia, viz. :—*Calodema Wallacei* and *Chalcophora Macfarlanei*, and 62 species of Australian Buprestidæ new to science. By Mr. C. French, jun.—Eggs of Black-fronted Flycatcher, from North Queensland, and egg of White-throated Nightjar, from Heyfield, Gippsland. By Master R. Grey.—Shells, &c., from Sandringham. By Baron von Mueller, K.C.M.G.—*Cyperus squarrosus* of India, new for Victoria, collected at Wimmera by Mr. F. Reader.

After the usual conversazione the meeting terminated.

EXCURSION TO HEIDELBERG.

SATURDAY, 12th January, turned out a hot day, but about a dozen members met at Collingwood to take train for a visit to the Heidelberg lagoons. In the shade of the willows an abundance of pond life was procured. Spherical free-swimming colonies of *Lacinularia natans* were in abundance, this rotifer having been plentiful for some months past. Sponges, Hydra, Volvox, and a large quantity of Polyzoa were found. Among the objects noted later may be mentioned *Brachionus militaris* as being observed for the first time. The Polyzoa had large numbers of tube-building and other sedentary rotifers attached to the cœnecium, taking advantage of the food supply brought in by the tentacles of their host. Mr. Rousselet's rotifer-killing method proved efficacious with the Polyzoa, the application of hydrochlorate of cocaine solution stupefying them in a fully extended position, and Fleming's solution fixed them without any further change.—J. SHEPHARD.

ON A SNAKE NEW FOR VICTORIA.

By C. FROST, F.L.S.

(Read before Field Naturalists' Club of Victoria, 10th Dec., 1894.)

THE subject of the present note was sent to me by Mr. F. Reader, of Dimboola, to whom I am greatly indebted for a number of specimens forwarded to me at various times. The snake was killed in September last, and reached me about the end of that month. In answer to subsequent inquiries, Mr. Reader informed me that the snake was captured by Mr. Chas. M'Lennan whilst chopping down the trunk of a tree in a paddock owned by his brother, close to the township of Dimboola.

In colour and habit this snake resembles *Hoplocephalus nigrostriatus*, Krefft, which is recorded from Rockhampton and Cleve-

land Bay, but in structure it is more closely allied to *H. nigriceps*, Gunth., a species inhabiting the western districts of New South Wales, and differs largely from all the species previously recorded as occurring in Victoria. Although I regard the species as new, I refrain from naming it until I have an opportunity to examine other specimens.

The following is a brief description :—Head scales as in *H. nigriceps ;* head not distinct from neck, depressed, rounded ; tail short, very distinct from trunk ; upper surface of posterior half of tail covered with large hexagonal scales.

Scales of body in 15 rows.
Abdominal plates, 152.
Subcaudals, in a single series, 24.
Total length, 14½ inches.
Head, 6 lines.
Tail, 1½ inches.

Colour.—Pale olive brown above, the anterior margin of each scale dark brown ; head and a broad vertebral band extending to tip of the tail dark purple brown ; under-surfaces whitish, immaculate. The tongue is white, with two faint longitudinal dark lines.

WALHALLA AS A COLLECTING GROUND.

By Henry Thos. Tisdall, F.L.S.

(*Read before Field Naturalists' Club of Victoria*, 11*th Feb.*, 1895.)

The great drawback in taking a trip to Walhalla is the wretched roads from the railway stations. There are three roads—one from Moe, the second from Traralgon, and the third from Toongabbie ; each of them presents its own peculiarities, but they all agree in two particulars—namely, vile tracks (especially in winter) and lovely scenery.

The way I selected was from Moe. This township consists of the usual number of hotels, shops, banks, churches, &c., generally found in such places, but it is peculiarly situated on a sandy plain covered with bracken and small trees of honeysuckle (Banksia), ti-tree, heaths, and other flowering shrubs. I never saw the white variety of the *Epacris impressa* in such quantity or so beautiful as on this plain. The first fifteen miles passes through a district of low sandy hills, covered with heaths, Banksias, and occasional clumps of Blackwood trees. On the slopes of the high sandy hills which fall towards the River Tyers there is a splendid collecting ground for botanists during the spring and early summer, the hills being covered with a perfect carpet of flowers and ferns. After passing the Tyers the soil is of much better quality, and the hills, which rise gradually to a height of 1,000 to 1,200 feet above sea level, are well clothed with fine gum trees, the most noticeable being Messmate, *E. obliqua*, White Gum, *E.*

amygdalina, Stringybark, *E. capitellata*, Ironbark, *E. leucoxylon*, and Yellow Box, *E. meliodora* ; the undergrowth being mostly composed of various species of Acacia, Blanket Tree, *Senecio Bedfordi*, Hazel, and a species of Daviesia, which is locally termed the native hop. A fair number of settlers have taken up most of the land at each side of the road. Whilst stopping at one of these farms some years ago I was shown a number of native stone axes which were found in the valley of a small stream which runs into the Tyers. Of course they originally belonged to a tribe of aborigines, but it is rather puzzling to think why they should have encamped in such a district, where there is little or no game, and which is situated so far from the sea. From the number of axes found it may be concluded that the tribe was of some importance. The road now winds downwards into Jacob's Creek, and thence upward to the table land of Moondara ; this part of the country is of basaltic origin, and is now covered with farms to the very foot of Mount Baw Baw.

The following extract, containing a description of a portion of Moondara was written by me and appeared in the *Australasian* in June, 1885 :—"The Moondara Creek heads, in their primitive state, must not be confounded with ferntree gullies. Instead of a narrow gorge, with the usual mixture of rocks, luxuriant vegetation, and sparkling water, we have a wide flat containing some sixty acres, the declivity being hardly perceptible ; the black soft soil is partly covered with bright green ferns, some growing erect, others bending in graceful curves ; the few fallen logs scattered about are completely covered with tiny ferns, mosses, and lichens. The Musk trees meet overhead, almost obscuring the sunlight ; from their contorted stems that lovely parasitic fern *Polypodium scandens* is pendent, whose shining green leaves help to brighten the sombre effect of the grey bark, while their curious hand-like shape heightens the weirdness of the place. Masses of long filmy ferns, like mermaidens' hair, float in festoons from the brown stems of the tree ferns ; ropes of Supple-jack, *Clematis aristata*, hang about in all directions ; gigantic clumps of the White Gum rise here and there, piercing the canopy of foliage : their roots, thrust out from the base, grow in twisted folds like huge boa constrictors. In many places stand groups of Blackwood trees, a few measuring as much as four feet in diameter. Altogether the gloom, pierced at intervals with struggling rays of sunshine—the twisted gnarled, and fantastic shapes of most of the trees, and the strongly contrasted colours, together with the ghostly appearance of the white gum trees, produce a scene that for weird beauty I have never seen equalled."

I am informed that there are many parts of the Moondara plateau which is in the same primitive condition as that just described. About three miles further the road begins to descend

into the valley of the River Thomson ; when I say road I mean an abominable track which winds round a huge spur, and which is bounded on one side by an almost inaccessible mountain, and on the other by such a descent that, if by any mischance the coach were to leave the track, it would certainly go down to the bed of the gully some six hundred feet beneath. However, we arrived safely at the river, which is here spanned by a wooden bridge. This part of the Thomson was a place of importance some years ago, in consequence of the finding of a large copper lode, but the fall in the price of that metal threw it out of the market, and the busy hundreds of miners and woodmen had to seek elsewhere for employment.

After a long, tiresome pull up the cutting we arrive at the top of the spur, where we obtain a lovely view of Mount Baw Baw in the distance, and below us the basin of the Thomson, whose sparkling waters could be seen gleaming in the evening sun, as it wound its devious way through the wood-clad hills.

A smart journey along the top of the spur soon brought us to the old goldfield at the "Happy," from whence we bowled down the long spur into the deep valley or gorge of Stringer's Creek, on the banks of which Walhalla is built. The town is a curious straggling mass of houses built in every conceivable situation. A few shops, private houses, and places of business, together with the buildings in connection with the Long Tunnel mine, occupy the very narrow space left between the bed of the creek and the abruptly rising hills, and extend up the valley for about two miles. All the other houses are built on shelves cut out of the sides of the hills. The approaches to these houses are either up steep paths cut out of the hill, or they are placed near some of the numerous wood tramways.

Unfortunately for the collecting of fungi, the weather had been so dry that I gave it up at once as a bad job. So I turned my attention to looking up four groups of animal life, namely—worms, frogs, lizards, and Planarians. The drought had forced the worms into the ground, but I got some very large specimens by breaking up the rotten logs, which are very numerous in the upper portions of both branches of the creek. As I know very little about either of these groups of animals, I shall content myself by giving a detailed list, at the end of the paper, of the species which I brought down and handed over to Prof. Spencer. Frogs were fairly plentiful, and I found a good many on the sides and tops of the hills as well as in the bed of the creek. A few, if not true tree-frogs, were at any rate discovered on tree ferns, many feet from the ground ; their favourite haunts were under fallen logs, in places well sheltered by ferns. In one species of brown speckled frog I observed a curious habit. I encountered several of them amongst some ferns along one of the wood

trams. When I attempted to catch them I found them too quick, and they all got away, with one exception. Whilst springing away they emitted a quantity of slimy fluid, and as I had never observed such a habit amongst frogs before, I thought I would mention it this evening.

The warm weather just suited the lizards, and I found a great number. The largest species were on the tops of the hills, which rise here to nearly 2,000 feet. These large ones were invariably discovered under rotten logs. The greater number of lizards were found on the hillside or on the tramways, basking in the rays of the sun. A few smaller ones were found near the bed of the creek, generally lying on stones, but occasionally under decayed logs. There was one species which Prof. Spencer said he was quite unacquainted with, and which he trusted might prove a new species.

My first few trips after Planarians were complete failures, but I found afterwards that these failures were occasioned by my ignorance of their habits. For many miles I travelled along creeks and fern gullies, over high hills and along the trams, but not a single Planarian could I find. At last, Mr. H. Dendy, of Walhalla, who had been out several times with Dr. Dendy, was at liberty to accompany me, and within a couple of hours he discovered two very fine specimens of *Geoplana Spenceri*, under a large stone on the tram, exactly opposite where the sun had been shining all day. Now, I had been looking in the dampest places I could find, but this discovery revolutionized my movements. The first day we got half a dozen specimens, but the next day, accompanied by a stalwart young friend, Mr. Charles Hartrick, we started on regular Planarian trips. We turned over all the logs we could find along the tops of the spurs, and were very successful. We also visited some deserted trams and carefully examined under all logs and stones which we could see lay where the sun could shine on them occasionally. I kept the specimens in two of those glass jam jars with a patent fastening. Filling the jars very loosely with some of the soft filmy ferns (*Hymenophyllum nitens*), well damped, I simply slipped in the Planarians as I got them. A curious thing happened about a week after I commenced collecting: whilst opening one of the jars my foot slipped and the edge of the jar struck the light crowbar which I was carrying and knocked a tiny chip off. I looked carefully to see whether anything could get out, and came to the conclusion that the glass stopper completely covered the flaw. Now, I had in this jar over forty fine specimens of *Geoplana Spenceri*, and about the same number of the yellow *G. mediolineata*, together with four of the brown *G. Walhalla*. I left the jars out in a damp place, and the next day I thought I would give them some fresh damp ferns. In order to do so I

emptied the jar, and you may imagine my disgust when I found the yellow and brown ones all right, but every one of the forty blue Planarians had disappeared. Of course, they had found out the little hole at the top, and when I looked more closely I could see that there was a slight aperture between the stopper and the edge of the jar, but it really was very slight. The curious thing was that all the blue Planarians should take advantage of this, and that not one of the others should. Is it possible that their language should differ so much that they could not explain to their yellow brethren, or was it that class distinctions are so rigidly carried out in Planarian society that they would not tell them, but meanly left them to their fate?

Whilst looking for these curious animals, that seem to partake of the different natures of the worm, the leech, and the snail, I was always guided in my search by the presence or absence of dead beetles, cockroaches, or even woodlice. If the empty shells of these should be present so surely would I find Planarians. It is curious to think that a soft, slimy-looking animal, such as a Planarian is, should prey on such well-protected insects as beetles, but so it is. The Planarian, crawling about in the dark, comes in contact with a sleeping beetle; it covers the insect with a peculiar sticky slime, which exudes from its outer covering, and then clasping itself round its victim, with its mouth (which is situated about the centre of the under surface of the body) opposite some cleft in the armour of the beetle, it protrudes the sucker-like pharynx through the mouth-like opening, and plunging it into the victim's body slowly sucks out all its juices. Before I leave the Planarian I should like to give an account of my experience as to their habitat as a guide to any of our members who may visit this district for the purpose of collecting them. (1) The blue Planarian, under large logs, in the full face of the sun and on the tops of the hills. (2) The yellow Planarian, in shady situations, such as on trams facing the south, either under small stones or, if early in the morning, crawling over stones and earth. (3) The brown Planarian, in damp situations, deserted trams facing the south, or even next the bed of the creek, under stones or logs. Note that the sun must fall upon the spot some time in the day.

Besides worms, frogs, lizards, and Planarians, I was fortunate enough to discover a Peripatus, also a number of Nemertine worms, and I am quite sure that if it had been a damp season I could have gathered any quantity of natural history specimens in this favoured locality.

The following were the lizards obtained :—Agamidæ—*Amphibolurus angulifer*, Gray. Scincidæ—*Hinulia Quoyii*, D. and B.; *Liolepisma Guichenoti*, D. and B.; *L. mustelinum*, O'S.; *Siaphos Maccoyi*, L. and F.

A SHELL NEW TO VICTORIA.

By C. Hedley, F.L.S.

Some years ago my friend Mr. C. T. Musson and I found in a saltwater lagoon near Sydney a tiny shell entangled in masses of flannel-weed. As no known species seemed quite to tally with it, we described and figured it as *Eulimella moniliforme* (P. L. S. N.S.W. (2), vi., 1891, p. 247, pl. xix., f. 1–3). From time to time I looked for the shell in the same pool, but never saw it there again. Mr. F. Billinghurst, of Castlemaine, and the Rev. W. T. Whan, of Port Fairy, have, however, re-discovered it in Victoria and have forwarded me specimens from a saltwater lagoon at Port Fairy. Not only the species but the genus seems an addition to the roll of known Victorian mollusca. Australian Museum, Sydney, N.S.W., 21st January, 1895.

Surrey Hills Field Club.—The members of this Society held a "camp-out" at a picturesque spot on the Yarra, near Lilydale, at Christmas time. Twenty-four members attended and spent five days under canvas. Among other specimens obtained were skins of the Little Bittern and Black-throated Grebe. All the party returned to town thoroughly pleased with their brief sojourn among the beauties of nature.—R. H.

Lizards.—I wish to bring under the notice of readers of the *Naturalist* that the Frilled or Dew Lizard, *Amphibolurus barbatus*, so often seen on the vines or vine stakes in the vineyards, and very frequently killed as an ugly and dangerous reptile, ought to be most carefully preserved, as it is, I believe, the only living thing which eats the vine caterpillars (the larvæ of the moth *Agarista glycine*). I commend the above to the notice of vignerons in the hope that they may be led to appreciate at its true value the splendid service rendered to them by these little harmless friends, and to preserve them from the destruction which is at present dealt out to them whenever seen.—G. E. F. Hill.

Kangaroo Grass.—Our well-known Kangaroo Grass was through the first half of this century known in systematic naming as *Anthistiria australis*, R. Brown. This name has since become a synonym of *A. ciliata* of the younger Linnæus, who described it from Arabia and Egypt in 1779, the Government Botanist of Victoria (not without some prior surmises) demonstrating the identity of the Australian with the Asiatic and African species. Now, however, the Austrian botanist, Prof. Hackel, the leading investigator of grasses at the present time, restores for our Kangaroo Grass the earliest name, *Themeda triandra*, given by the Danish professor and traveller, Forskoel, who died at Oscherim in 1763, published in 1775. Baron von Mueller intends to adopt this naming of the Anthistiria for the third "Census of Australian Plants," due in 1896.

A CATALOGUE OF VICTORIAN HETEROCERA.

By Oswald B. Lower, F.E.S.

Part XIII.

NOCTUINA *(continued).*

405. D. selenophora, Gn. (*loc. cit.*, iii., 175; Walk., Lep. Het., xiv., 1,299).
Melbourne, Gisborne, Oakleigh, &c.
Common in houses.

SERICIA. Gn.

406. S. spectans, Gn. (Noct., iii., 173, 1,563; Walk., Lep. Het., xiv., 1,296).

A doubtful Victorian species. Have seen a specimen purporting to have been taken near Melbourne.

LAGOPTERA. Gn.

THYAS. Gn. (?)

OPHIODES. Gn.

OPHYX. Gn.

SERRODES. Gn.

MELIOPTIS. Gn.

OPHIUSA. Gn.

GRAMMODES. Gn.

407. G. oculicola, Walk. (Lep. Het., xiv., 1,446; *G. oculata*, Snell, Tyd. V. Ent., 103, 1880; *G. ommatophora*, H. S., pl. viii., fig. 6).,
Grampians.

FODINA. Gn.

AGARISTA. Leach.

TRIGONODES. Gn.

408. T. hyppasia, Cram. (*Phalæna* (*Noctua*) *hyppasia*), Cram., Pap. Ex., iii.; pl. 250, fig. c., 1,779; *Trigonodes compar*, Walk., xiv., 1,451, 1852.
Albert Park, Kewell.

REMIGIA. Gn.

409. R. frugalis, Fab. (*Noctua frugalis*, Fab., Ent. Syst., iii., 2,139, 1794; *Chalciope lycopodia*, Geyer., Hb., Zutr. Ex. Schm., 25,499, figs. 897 and 898, 1837; *Remigia translata*, Walk., xxxiii., 1,015, 1865).
Melbourne.

CATADA.
ZETHES.
LACERA.
ISTARVA.

410. I. SCITISIGNATA. Walk.
411. I. XYLISTIS, Meyr. (MSS.)
Melbourne, Cheltenham, Gisborne.

EROSIA. Gn.
THERMESIA.

412. T. IMPROPRIA, Walk. (Noct., xxxiii., Supp., 1,064).
Poowong, Kewell, Melbourne.

DICHROMIA.
HYPENA.
BRITHA.
PRIONOPHORA. Meyr.

413. P. RUPTELLA, Walk. (*Crambus ruptellus*, Walk., Cat., 173; *Prionophora ruptella*, Meyr., Proc. Linn. Soc. N.S.W., p. 179, 1878).
Melbourne, &c.

414. P. GRAMMATISTIS, Meyr.
Melbourne, Gisborne, &c.

*415. P. TORQUESARIA, Lucas (Proc. Linn. Soc. N.S.W., 255, 1892).
Kewell, Muckbilly Creek.

HYPOCALA. Gn.
CALPE.
RHAPSA. Walk.

*416. R. SCOTOSIALIS, Walk. (Supp., 1,150; *Herminia lilacina*, Butl., p. 3, S. Lond., 1877, pl. xlii., fig. 11).
Melbourne, Springvale.

SPINTHEROPS.

417. S. VINCTALIS, Walk.

HERMINIA.
BLEPTINA.

418. B. SORDESCENS, Rosen. (? Ann. Mag. N.H.; *B. crossodora*, Meyr., MSS.)
Melbourne, Gisborne, Fernshaw, Oakleigh.

ECHANA.
HYDRILLODES.

Group—PYRALIDINA.

This present group is divisible into thirteen families, although Meyrick, in a recent contribution to the Entomological Society of London, has merged the *Hydrocampidæ* and *Scopariadæ* into the *Pyraustidæ*, and the *Epipaschiadæ* into the *Pyralididæ*, besides forming quite a new arrangement. I have hitherto considered the genus *Hydrillodes* (*Noctuina*) more closely allied to the genus *Epipaschia* than any other, and for that reason I adopt the following arrangement as more convenient and seemingly natural. Meyrick considers the group under notice as possibly being a development of a group of *Bombycina*. This seems highly probable in some respects, but the same remark would to some extent apply to certain *Noctuina*. Of course, I consider it highly advisable to have a recognized arrangement, but, as most authors are at loggerheads, it seems useless for me to attempt any systematic classification at the present juncture. My arrangement of the Australian species is as follows:—*Epipaschiadæ*, *Pyralididæ*, *Musotimidæ*, *Hydrocampidæ*, *Botydidæ*, *Scopariadæ*, *Crambidæ*, *Galleriadæ*, *Phycididæ*, *Tineodidæ*, *Oxychirotidæ*, *Pterophoridæ*, *Alucitidæ*.

Family—EPIPASCHIADÆ.

EPIPASCHIA. Clem.

419. E. SABURALIS, Walk. (*Pyralis saburalis*, Walk., B. M. Cat., 914; *Astrapometis saburalis*, Meyr., Tr. Ent. Soc. Lond., p. 67, 1883).
Gisborne, &c.

420. E. FUNEREA, Walk. (*Acrobasis funerea*, Walk., B. M. Cat. (Cr.), 31; *Catamola funerea*, Meyr., Tr. Ent. Soc., p. 65, 1883).
Melbourne, Gisborne, Sale.

*421. E. CAPNOPIS, Meyr. (*Catamola capnopis*, Meyr., Tr. Ent. Soc., p. 439, 1885).
Melbourne.

TITANOCEROS. Meyr.

STERICTA. Ld.

*422. S. HABITALIS, Gn. (*Glossina habitalis*, Gn., Pyral., 125; *Pyralis nauplialis*, Walk., B. M. Cat., 272; *P. porphyralis*, *ib.*, Supp., 1,243).
Gisborne, Ararat, Melbourne.

423. S. COSTIGERALIS, Walk. (*Pyralis costigeralis*, Walk., Tr. Ent. Soc. Lond., i., 3rd series, 121; *Cacozelia costigeralis*, Meyr., *ib.*, 439, 1885).
Gisborne, Melbourne, Stawell, Castlemaine, Fernshaw.

*424. S. THYRIDALIS, Walk. (*Bertula thyrisalis* (!), Walk., B. M. Cat., 167 ; *Catamola thyridalis*, Meyr., Tr. Ent. Soc., p. 64, 1883).
Melbourne, Gisborne.

425. S. RECURVALIS, Walk. (*Salma recurvalis*, Walk., Cr., 107 ; *Exacosmia rubiginosa*, *ib.*, Supp., 609 ; *Crambus melanospilellus*, *ib.*, Supp., 1,759 ; *Stericta recurvalis*, Meyr., Tr. Ent. Soc. Lond., 189, 1887).

*426. S. FIMBRIALIS, Walk.
Melbourne, Dandenong Range.

*427. S. DEMOTIS, Meyr. (Tr. Ent. Soc. Lond., 187, 1887).
Melbourne.

The specimen sent me was not in good condition, consequently the locality requires confirmation. The type was from Geraldton, Western Australia.

FAMILY—PYRALIDIDÆ.

BALANOTIS. Meyr.

*428. B. CRYPSAULA, Meyr. (Tr. Ent. Soc. Lond., 191, 1887 ; *B. recurvalis*, Meyr., *loc. cit.*, 70, 1884—*nec* Walk.)
Lal Lal.

STEMMATOPHORA. Gn.

AGLOSSA. Latr.

*429. A. CUPREALIS, Hb. (*Acrobasis inculteila*, Walk., B. M. Cat., Supp., 1,712).
Melbourne.

430. A. PINGUINALIS, Linn.
Melbourne.

The above two species probably are introduced from Europe.

OCRASA. Walk.

*431. O. DECOLORALIS, Ld. (*Asopia decoloralis*, Ld., Pyr., 458, pl. vii, 10 ; *Ocrasa decoloralis*, Meyr., Tr. Ent. Soc. Lond., 72, 1883).
Melbourne.

*432. O. ALBIDALIS, Walk. (B. M. Cat., Supp., 1,212 ; Meyr., Tr. Ent. Soc. Lond., 73, 1883).
Melbourne, Windsor, Gisborne, &c.

ASOPIA. Tr.

433. A. FARINALIS, Linn. (*Pyralis fraterna*, Butl.)
Victoria.

*434. A. CAUSTICA, Meyr. (Tr. Ent. Soc. Lond., 282, 1884).
Hamilton, Melbourne.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th March, 1895. Mr. F. G. A. Barnard, a vice-president, occupied the chair, and some 70 members and friends were present.

LIBRARIAN'S REPORT.

The hon. librarian acknowledged the following donations to the library:—"Proceedings of Linnean Society of New South Wales," vol. ix., parts 2, 3, 4, from the Society; "Transactions of Royal Society of South Australia," vol. xviii., from the Society; "Proceedings of Royal Society of Queensland," vol. x., from the Society; "Journal of Bombay Natural History Society," vol. viii., No. 5, and vol. ix., Nos. 1 and 2, from the Society; "Report of Missouri Botanical Garden, 1894," from the Director; "Smithsonian Report on United States Museum, 1891 and 1892," from Smithsonian Institute; "Monthly Lectures at School of Horticulture," from the Department of Agriculture, Victoria; "Geological Survey of Victoria," from Mr. C. French, jun.; "Descriptive Account of Field Columbian Museum," from the Director.

REPORTS.

A report of the geological excursion to the Moonee Valley, received from the leader, Mr. G. Sweet, F.G.S., recorded a well attended and very profitable outing.

MEETING FOR PRACTICAL WORK.

The hon. secretary reported that a second evening was devoted to the Hymenomycetes on 25th February by Mr. H. T. Tisdall, F.L.S. After a preliminary discussion of the classification by means of the colours of the spores, the practical dissection of various forms was proceeded with. The identification of the edible species was also dealt with, this part of the subject being illustrated by coloured drawings. Many kinds which are usually classed as "toadstools" were declared to be excellent eating. These species are generally very distinctive, and on the Continent of Europe are preferred to the common mushroom, which is discarded owing to its resemblance to allied poisonous forms. The lecturer proposes in the coming autumn to test the edible qualities of some of those described.

ELECTION OF MEMBER.

On a ballot being taken Mr. Jas. Weddells was elected a member of the Club.

PAPERS.

1. By Professor W. Baldwin Spencer, entitled "Collecting Notes from Central Australia."

In this paper Professor Spencer gave a brief account of a trip made to Charlotte Waters during the months of January and February, 1895. The objects of the trip were to secure certain forms of animals only obtainable after a heavy rainfall in the central desert region and to observe the change in the nature of the country at such a season. The country, which in the middle of the previous year had been dry and the vegetation parched, was now fresh and green with rich herbage, which had suddenly sprung up. The claypans and waterholes were filled and alive with frogs which had emerged from the burrows in which they had been æstivating. In particular the burrowing frog, *Chiroleptes platycephalus*, which when æstivating has its body filled with water and swollen out like an orange, was now plentiful, though during the dry season it can only be obtained by digging it out of its burrow. Another burrowing form, *Heleioporus pictus*, was also plentiful. Many of the waterholes contained numerous tadpoles, which had evidently developed rapidly, as no trace of spawn could be found, though the pools had only been flooded for a short time.

In the claypans numerous specimens of a new species of Apus of a large size were found, this being the first occasion on which this genus has been definitely described from Australia.

Amongst marsupials, a specimen of the now rare Pig-footed Bandicoot, *Chœropus castanotis;* a well-developed female Marsupial Mole, *Notoryctes typhlops*, showing the pouch and two teats clearly; a few specimens of the rare *Phascologale cristicauda*, and specimens of a new species of Phascologale of the size of a large rat, were obtained.

Of lizards a fair collection, including four new species, was made. In one spot on the Finke River a good number of the somewhat rare and beautifully coloured *Amphibolurus maculatus* was collected, and it was noted that there was a well-marked difference in colouration between the male and female. Amongst the frogs, especially, it was observable that the colours were much brighter than during the dry season.

The animals collected form a valuable supplement to those obtained during the recent Horn expedition, when, owing to the dryness of the country, certain of them (such as the Apus) could not be obtained, though typical of the central district.

2. A second paper, compiled by Mr. H. Kendall, entitled "Jottings from Townsville," was, in the absence of the author,

read by the hon. secretary. This paper consisted of notes received from Mr. E. M. Cornwall, a keen observer and formerly an active member of the Club, now residing at Townsville, North Queensland. The habits of the various creatures frequenting a waterpool in his garden were described at some length. Several extraordinary instances of the appearance of small fish after rain in pools previously dry for years were vouched for by the writer.

In the discussion which followed, Professor Spencer stated that he believed that the appearance of fish under these circumstances could always be explained either by the agency of birds or by connection with permanent waterholes during floods.

NATURAL HISTORY NOTE.

A note was read by Mr. R. S. Sugars on "The Gannets of Malden Island." The nidification of the three species of Gannet which are found on the island was described in detail and disclosed remarkable differences from the habits of the Australian Gannet, *Sula serrator*, found breeding during the Club expedition to the Furneaux Group.

EXHIBITION OF SPECIMENS.

The following were the principal exhibits of the evening:—By Mr. C. French, F.L.S.—Lepidoptera new to science, viz.:—*Sesia isozona*, Meyrick, and *Charagia mirabile*, Rothschild, both from North Queensland; also, *Liphyra crassolis*, Westwood, male and female, from North Queensland, this being new for Australia, and is one of the very rarest of the known Lycænidæ, hitherto only known from India. By Mr. C. French, jun.—Eggs of the following Queensland birds, viz.:—Quoy's Butcher Bird, Red-necked Rail, Allied Fruit Pigeon, Crescent-marked Oriole, and White-vented Wood-Swallow. By Mr. T. S. Hart.—Slickensides, from Ferny Creek, near Ferntree Gully. By Baron von Mueller, K.C.M.G.—A "fasciated" monstrosity of *Lilium auratum*, the stem having attained a breadth of five inches and the inflorescence a diameter of twenty inches, consisting of 208 more or less developed flowers. This remarkably huge specimen came from the garden of Mr. Turner, at Mount Macedon. Also, a double parasitism—namely, a Notothixos growing out of Loranthus, the latter from a Banksia. This specimen was forwarded by Miss Georgina King, of Sydney, and was obtained by Mr. Bray near the Blue Mountains. Baron von Mueller had occasionally observed instances of one Loranthus being a parasite on another, the species being *L. pendulus* and *L. linophyllus* Also, some marsupials from Western Australia. By Professor W. Baldwin Spencer.—Pair of live Princess of Wales Parrakeets from Central Australia, previously not seen in Victoria; also, marsupials, frogs, &c., in illustration of paper.

After the usual conversazione the meeting terminated.

EXCURSION TO WILLIAMSTOWN.

The excursion on Saturday, 9th February, was planned for the Back Beach, Williamstown, and a party of six members of the Club left town about 2 o'clock for the purpose of testing that locality as a fishing ground for microscopic organisms, on similar lines to those pursued on a visit to the coast off Hampden this time last year. A glance at the locality named sufficed to show that the prospects of sport were not encouraging. A stiff breeze blowing towards the shore tumbled the sea too much to allow of the tow-net being put down. A move was therefore proposed to quieter waters, which were found near the *Gem* pier. Here a boat was secured, and, once clear of the shipping near, the tow net was put out by Mr. Shephard. The muddy appearance of the water gave little hope of success, and only a few "dips" were indulged in, so as to allow each member to carry home some of the spoils. However, a slight investigation of the material at home revealed a good many interesting larval forms, principally of the Echinodermata. Medusoids were also fairly plentiful, together with a Radiolarian, occurring singly and in groups. The Hampton waters gave similar results, and that locality is recommended, for obvious reasons, in preference to Williamstown for future towing operations. As remarked last year, a very profitable field of investigation is opened by excursions similar to that of last Saturday, and it is hoped that members will undertake such excursions privately from time to time at different seasons of the year, so as to furnish particulars of the larval fauna of the waters of Port Phillip.—W. Fielder.

EXCURSION TO THE MOONEE VALLEY.

Ten members and their friends met on Saturday, 23rd February, 1895, on the Moonee Ponds railway platform. A divergence from the direct course to the Moonee Ponds Creek was made for the purpose of inspecting the cutting in the western end of the new extension of Brunswick-road, west of the creek, where there are to be seen the Tertiary ferruginous sandstone and grits, which form the subsoil of the plateau from the railway station to this cutting. These were observed to be clearly stratified, though in some places there was observed a concretionary form. Here a search was made in the sandstone for fossil leaves, which were believed to exist, and some undoubted though fragmentary specimens were obtained, proving their existence in this deposit; and our search in the less sandy and more ferruginous portions was rewarded by numerous examples and fragments of Gasteropods and Lamellibranchs.

Following the cutting lower down the hill, this marine deposit was found to rest on the denuded surface of the older basalt,

now decomposed, the nodular structure of which is here and there still perceptible. This material continued to the eastern end of the cutting. Crossing the paddocks in a north-easterly direction, the creek was soon reached, where we immediately came upon recent ferruginous sandstones in the sides of the creek, closely simulating in some respects those we had just left, which were of Tertiary age.

The creek for some distance has eroded its course down into the Upper Silurian rocks, and along its windings these were continued till we reached the cliff. One of the first features to attract attention here were the "ripple markings" on some of the thicker of the sandstone beds. The fact as to whether these markings were really ripple marks had been disputed, and the evidences for and against were discussed with much interest, the unanimous verdict being finally in favour of their being such. Descending a few yards lower down the creek, by the cliff, a diligent search was made for examples of the fossils for which these rocks are famous, and numerous specimens were collected.

The next point to receive attention was the decomposed "Elvan" dyke, and the disturbance in adjacent rocks was noted. Ascending the steep bank to the roadway immediately above the dyke and a few yards to the north of its appearance in the road cutting, a small anticlinal fold was observed in the Silurian rocks. From here the road was followed northwards into the cutting at the western end of Union-street, Brunswick. Almost immediately above the cliff Tertiary deposits were again met with, crowning the summit of the hill of Silurian rocks in that locality, and were seen to rest directly on them, its unconformability with the Silurian being distinct. Expressions of satisfaction at the afternoon's observations were exchanged, and the party dispersed.

Among the specimens obtained from the Tertiary grits were the following:—Plant remains—Ancillaria, Peristerina, Haliotis, Mactra, Leda; and from the Upper Silurian rocks—*Orthoceras ibex*, *Rhynchonella decemplicata*, Trematospira, Orthis.—Geo. Sweet.

PRELIMINARY DESCRIPTION OF A NEW SPECIES OF APUS.

By Professor Baldwin Spencer and T. S. Hall, M.A.

The following is a brief description of a new species of the genus Apus—the first which has as yet been described from Australia.

Apus australiensis, sp. n.

Carapace a short oval. Its length about equal to the length of the portion of the abdomen which is not covered by the carapace, though this is liable to considerable variation.

Proportion of greatest breadth of carapace to its median length, 4 : 3.

Length of carina compared with that of carapace, 2 : 3.

Length from posterior end of carina to posterior angle of carapace, 1 : 2.

Length of carina compared with median length of carapace, 2 : 3.

Carina minutely and irregularly serrated and ending in a spine posteriorly.

Sinus of the carapace with about 18 minute teeth on each side of the mid line: sometimes rudimentary or absent in some parts of the margin.

Posterior outer margin of the carapace with minute serrations which gradually become more minute on passing forward, until they disappear at about half the length of the carapace.

Dorsal surface of the carapace sparsely covered with irregularly scattered minute blunt projections.

Number of abdominal segments uncovered, about 29.

Number of abdominal segments not bearing limbs, about 12.

Each limbless segment of the abdomen with about 15 sub-equal, short, conical spines, arranged in a single row, with numerous smaller ones irregularly scattered over the under surface.

The exposed limb-bearing segments with spines on the upper surface and sides, becoming obsolete in the anterior segments.

Telson a little less than twice as long as broad.

Upper surface of telson with 3 or 4 median spines; a spinous posterior border and sides and 2 or 3 spines forming a group on each side anteriorly.

Lower surface of telson minutely spinulose, with a median and two lateral depressions, free or nearly free from spines.

Caudal appendages considerably longer than the median length of the carapace.

Second antennæ absent.

The 5th endite of the 1st thoracic appendage varying much in length. It may reach as far back as the 15th exposed abdominal segment, or it may reach only to the posterior end of the carina.

No difference in size or proportions between the males and females.

Total length of the largest male, from the anterior margin of the carapace to the end of the telson, 70 mm.

Total length of the largest female, 64 mm.

Out of a total of 58 individuals, 6 are males, 52 females.

Locality.—Central Australia. In waterholes at different localities between Oodnadatta and Charlotte Waters (W. B. Spencer). A single specimen, collected by Mr. J. A. Kershaw, was found near Kewell, Victoria, and has been kindly placed by him at our disposal.

NOTE ON MICROSCOPICAL TEST RULINGS.

NATURAL tests, such as diatom frustules, have long been used for testing the resolving and defining power of microscope lenses. They are, however, very variable as regards the "fineness" of the striations and other markings in different individuals of the same species, and their employment as tests is, therefore, open to doubt. To supply the want of a recognized standard, the late Herr Nobert conceived the idea of producing artificial tests in the form of ruled bands of lines of increasing fineness and closeness. His rulings have contributed very largely to improvements in the manufacture of microscopic lenses, and have never been excelled.

More than a year ago it occurred to me that I could produce a series of lines on the pattern laid down by Nobert, and thus bring these tests within the reach of our local microscopists. The test rulings exhibited this evening are the outcome of my experiments in this direction, and I venture to state that they will bear the strictest investigation. In the construction of the machine with which the lines are produced I have had the assistance and advice of Mr. W. Stone. The conception and initiatory steps of the work and the ruling of the lines have fallen to me.

As regards the details of rulings on the slides exhibited, the first slide shows 11 bands of lines in regular series. The first band in the series includes lines drawn at the rate of 5,000 to the inch, and successive bands (the last excepted) increase by 5,000, the last one registering 60,000 lines to the inch. On the second slide the bands range from 5,000 to 100,000 in increasing intervals of 10,000 lines per inch, whilst on a third slide the ruling is continued in the same manner up to 120,000, without showing any signs of breaking down. The resolution of a band of 120,000 lines to the inch is said to be the limit of optical resolution with the most perfect lens and illuminating apparatus. One of the bands referred to is shown clearly resolved up to 80,000 under a $\frac{1}{12}$ oil immersion. With attention to the details of illumination, lines in the 100,000 band can just be discovered. That the lines in the higher bands exist is shown by the fact that they exhibit a spectrum when properly illuminated for the purpose, no rupture in the band being apparent.

In addition to the test rulings several micrometers are shown in the spacing of which it is impossible to detect any errors. A standard scale for these rulings has been obtained from the Melbourne Observatory. A mean reading of 20 centimetres is taken as a basis for a miscroscopic standard of one centimetre, which may be regarded as accurate to within the 50,000th of an inch. The English inch values are calculated from this, and further compared with an accurate copy of a Troughton and Sims's scale (also from the Observatory). Fifteen millimetre rulings, super-

imposed, reversed, and otherwise compared, reveal no errors under comparatively high powers. The bands exhibited are ruled upon specially prepared glass, ordinary "cover" glass being unsuited for the attainment of the most perfect results.—H. J. GRAYSON. St. Kilda, 9th July, 1894.

A LEPIDOPTERIST AT PHILLIP ISLAND.

TAKING advantage of a few days' holiday at Christmas, I decided to pay a visit to that charming locality for excursionists, Phillip Island, and landing from the steamer at Cowes, Mr. West's house was reached after a short walk, where a welcome luncheon was waiting. This disposed of, a start was made in a south-easterly direction. Signs of insect life were soon observed, but only the commonest species of Coleoptera and Hymenoptera were captured, although the Leptospermum bushes were well shaken and the bark stripped off the Gums, &c.

A specimen of the moth *Euplexia nigerrima* was easily captured and transferred to the cyanide bottle, also two specimens of *Hednota pleniferella*. A web of the larvæ of *Delias harpalyce* was noticed on *Loranthus pendulus*, and after a little trouble was secured. These were of a brown colour, in place of the usual black, the pupæ ultimately being red, with protuberances and wing cases outlined with black, though the perfect insect did not differ from others of the same species from elsewhere. The butterfly *Heteronympha merope* was to be seen in great numbers, but acting as beaters they caused the flight and ultimate capture of their scarcer brethren. The scorching heat of the sun at length compelled us to beat a retreat to the sea beach for a dip.

On the following morning, having a companion, although a drizzling rain was falling, a start was made for the Rhyll-road. While on our way through the bush about six male *Xenica klugii* were disturbed and captured, also a couple of fine skippers —viz., *Trapezites iacchus*—and a single specimen of *Euchloris cadmaria*. After lunch, the rain having cleared off, the sun became very powerful. Another specimen of *T. iacchus* was secured, along with one of *Hesperilla donnysa*, a variety with silver markings under the wings ; also *Lycæna labradus*. While returning a couple of specimens of *Agarista Lewinii* and *Euchloris submissaria* were obtained. After a welcome and well-earned meal the evening was devoted to the setting out of our captures.

Next day we struck out in an opposite direction to that taken the previous day. The first victim to the net being a female of *Chrysophanus aurifer ;* shortly afterwards the skipper *T. iacchus* went whizzing by, but soon returning was promptly captured and deprived of life. Close by a peculiarly marked male specimen of *H. merope* was also secured, along with *A. Lewinii*, and a web of the pupæ of *D. harpalyce* completed the day's captures.

The following morning we sailed over to French Island with a favourable breeze, but beyond observing evident traces of Hesperidæ in the Cladium, and capturing a female specimen of *X. Klugii*, very little was done.

Before leaving for Cowes, however, a Tiger Snake, whose powers of elongating itself after death were immense, was despatched. The wind having changed, and the tide being in our favour, we had a quick run back. Next morning a return was made for Melbourne, after spending a very enjoyable and profitable outing.—A. H. WESTLEY.

REVIEW.

DESCRIPTIVE CATALOGUE OF THE SPECIMENS OF THE ROCKS OF VICTORIA IN THE INDUSTRIAL AND TECHNOLOGICAL MUSEUM, MELBOURNE. Printed by permission of the Trustees. 1894. Pp. 127. Price 1s.

THE preface to this pamphlet states that the original catalogue, which was compiled by Ulrich and issued in a separate form in 1875, has "to some extent been used as a text-book." The present work is, however, practically a reprint of Ulrich's catalogue, with a few additions and still fewer alterations. The former work enumerated 577 examples, while the present one contains 783, or an addition of 106 examples. An improvement has been made in the arrangement, which permits new specimens being added in their proper places, which was impossible according to the old method, as the numbers were consecutive. One group we find (No. 9) is missing.

Ulrich's work has long been out of print, and is looked on as a valuable possession by those few geologists who have treasured up their copies. It was consequently with great hopes that we looked forward to the publication of the present work, but these hopes have been doomed to the bitterest disappointment. When Ulrich's catalogue was written it was up to date in its contents, and was written by one intimately acquainted with the geology and petrology of the colony. Since the date of the publication of his work twenty years have elapsed, and the classification which Ulrich employed was then already eight years old, for Zirkel's "Lehrbuch" appeared in 1866. During these twenty years a new science has grown up, and yet we find that the classification of the old catalogue is followed in all its details. During these twenty years some slight progress has been made in the unravelling of the geology of Victoria and of the neighbouring colonies, yet we find that Ulrich's descriptions of the rock formations have been copied almost unchanged, and the alterations can be counted on the fingers of one hand. The preface tells us that the catalogue "can be used with great advantage in the study of the rock formation of Victoria and adjoining

colonies." As scarcely any reference is made to rocks from other colonies, and none to the remarks made by extra-Victorian geologists as to the age of some of our formations, we find no hint of the occurrence of rocks that are referred to Archæan, Cambrian, Permo-Carboniferous, Marine Jurassic, or Cretaceous; and though the subdivisions Eocene, Miocene, and Pliocene certainly are recorded, yet an examination of the catalogue will show that this reference dates from a period anterior to that at which Professor M'Coy decided that we had no Eocene rocks in Victoria.

To attempt to point out all the errors would be a task far too long, and we shall content ourselves with a few that certainly should be corrected :—

Page 9.—The granite used in the construction of the present Prince's Bridge came from Harcourt, the Gellibrand's Hill granite being used in a previous bridge which was removed some years ago.

Page 10.—Auriferous quartz reefs in typical granite have been recorded near Heathcote by E. J. Dunn. (Reports of Mining Surveyors, December, 1888, page 76.)

Ulrich's reference of the occurrence of *Nepheline* in the Older Basalt of Phillip Island has been dropped, and *Apatite* is recorded in its place. Surely some hint of the change should have been given, as Ulrich's remarks have been copied into various works. Ulrich's descriptions are reprinted word for word with this single alteration (specimens 7.5, 7.6, 7.9).

Page 36.—When will the old mistake of Mount Eels for Mount Eccles be corrected?

Page 43.—*Obsidian* still appears on our lists, and has not yet been ousted by *Tachylite.*

Page 44.—There is no newer basalt at Maldon, and the Zeolites quoted occur in a quartz-felsite dyke.

Page 46.—The older basalt of Chetwynd (No. 7.24) is of Mesozoic age, as its ashbeds contain *Otozamites* (Dennant, Proc. Aust. Ass., Adelaide, page 395).

Page 58 (No. 10.6).—Mr. Howitt has identified a dyke-stone from the Eaglehawk Reef, Maldon, as Diallage rock. Possibly the reference to Amphibolite, then, is incorrect, as microscopic examination is required for their separation.

Page 72.—A Lower Silurian limestone—certainly, of very small thickness—is recorded from Bendigo by E. J. Dunn. The fossils of our Lower Silurian rocks are *not* similar throughout, and subdivisions founded on palæontological differences have been made.

Page 74.—Since the publication of Selwyn's map a fresh one has been issued by the Mining Department, under the direction of Brough Smyth, and even a new edition of this is promised.

Page 82.—A splendid series of Devonian fish has been gathered by Mr. Geo. Sweet in the Mansfield sandstones.

Page 87.—Two beds, totalling 13 ft., have, for some reason, been dropped out of the middle of the section described by Daintree, and consequently we have his figures—namely, 273 ft. —altered to 260 ft. As the section quoted by Ulrich is taken from the notes to the quarter sheet, we should like an explanation of this change. Daintree did certainly, elsewhere, give 260 ft. as the thickness displayed, but these are not the detailed figures there given.

There are many minor points to which attention might be drawn; but if the catalogue be regarded as Ulrich's, practically unaltered, its great stores of information will be of the greatest value to anyone wishing to know some of the localities for our Victorian rocks. It cannot, however, be looked on as a guide to Victorian geology, as the growth of our knowledge during the past twenty years has materially altered our views on many of the points here described. It is a pity that, stamped with authority as it is, and signed by such a well-known name, an attempt has not been made to bring it more up to date.—T. S. HALL.

ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Transactions of Royal Society of South Australia*," vol. xviii., 1893-4 :—

"On New Australian Heterocera," and "On Australian Rhopalocera," by O. B. Lower, F.E.S. Contain descriptions and references to several Victorian species.

"Supplemental Notes on the Blattariæ of Australia," by J. G. O. Tepper, F.L.S. Contains references to Victorian species.

"New Genera and Species of Australian Coleoptera," by Rev. T. Blackburn, M.A. (two papers). Contain descriptions of Victorian species.

In "*Proceedings Linnean Society of New South Wales*," 2nd series, vol. ix., part 2 :—

"Wood Moths; with some Account of their Life-Histories, from the Notes of Mr. R. Thornton, Wallsend, N.S.W.," by W. W. Froggatt. Contains some interesting particulars relating to the early stages of several moths found also in Victoria.

In "*Proceedings of Royal Society of Victoria*," vol. vii., new series, 1894 :—

"Notes on Some Lancefield Graptolites," by G. B. Pritchard.

"The Geology of Castlemaine, with a Subdivision of Part of Lower Silurian Rocks of Victoria and a List of Minerals," by T. S. Hall, M.A.

"On the Australian Species of Amathia," by Dr. P. H. MacGillivray, F.L.S.

"Note on the Occurrence of Fossil Bones at Werribee," by G. B. Pritchard.

"The Entomogenous Fungi of Victoria," by D. M'Alpine, F.C.S., and W. H. F. Hill.

"The Older Tertiaries of Maude, with an Indication of the Sequence of the Eocene Beds of Victoria," by T. S. Hall, M.A, and G. B. Pritchard.

"On a Molluscan Genus new to, and another forgotten from, Australia," by C. Healey, F.L.S.

"Australian Fungi," by D. M'Alpine, F.C.S.

"Contributions to the Palæontology of the Older Tertiaries of Victoria—Lamellibranchs, part i.," by G. B. Pritchard.

"Catalogue of Non-Calcareous Sponges collected by J. B. Wilson, Esq., M.A., near Port Phillip Heads," by Dr. A. Dendy, F.L.S.

"Contributions to a Knowledge of the Rhynchota of Australia," by E. Bergroth, M.D.

Catalogue of Minerals and Mineralogical Supplies (Geo. L. English and Co., New York), 16th edition, 1894.—Though unusual to notice publications which are trade catalogues in this journal, this work is so nearly a scientific production that we have no hesitation in bringing it under the notice of persons interested in mineralogy, and beginners especially will find much useful information in its pages. It comprises four sections :—(1) Crystallography, (2) Physical Mineralogy, (3) Chemical Mineralogy, (4) Miscellaneous, (5) Descriptive Mineralogy. The last section is, perhaps, the most valuable, as it consists of a synopsis of the classification of minerals, with a list extending over 60 pages of all the known "ites" and their synonyms, while the index itself contains about 3,300 references. A glossary of terms and the chemical formulæ of a large number of minerals add to the usefulness of the book, while the price list will enable collectors to ascertain the cost of filling some of the vacancies in their cabinets.

A Valuable Donation.—In a recent letter to Mr. C. French, F.L.S., from Mons. A. Bouchard, the well-known naturalist, he states that he has presented the whole of his magnificent collection of birds, comprising 28,000 specimens of 8,000 species, to the Museum of the Jardin des Plantes, in Paris, to which he also intends to hand over his extensive entomological collections.

Exchange.—Mr. W. E. Saunders, 352 Clarence-street, London, Ontario, desires to exchange for living named native plants, such as orchids, ferns, or easily grown herbaceous plants, similar Canadian plants, and invites correspondence with any person interested.

Vol. XI.—No. 1. April, 1894.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

PUBLISHED MAY 10, 1894.

Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions he records.

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PRICE SIXPENCE.

Agents for Europe:

DULAU & CO., 37 Soho Square, London.

Melbourne:

WALKER, MAY & CO., Printers, 9 Mackillop Street.

1894.

Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

Patrons:

BARON SIR F. VON MUELLER, K.C.M.G., M. & PH. D., LL.D., F.R.S.
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Committee: MR. C. FRENCH, F.L.S., MR. C. FROST, F.L.S., MR. G. R. HILL, MR. H. R. HOGG and MR. J. SHEPHARD.

OBJECTS.

THIS CLUB was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 14th May, 1894, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Merri Creek (Coburg), by Mr. G. Sweet.

2. Election of Members.

   The following persons have been duly nominated for election at this meeting:—

	Proposer.	Seconder.
Miss Chambers	Mrs. Bage	... Mr. J. Shephard
Master R. Grey	Miss Cochrane	... Mr. F. G. A. Barnard

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

   1. Nominations (to be in writing) for Office-Bearers for year 1894-5.
   2. Election of Two Auditors.

5. Reading of Papers and Discussions thereon.

   1. By Mr. C. Frost, F.L.S.—"Notes on the Habits and Senses of Spiders. Part II."

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in minutes and *Naturalist*.

Vol. XI.—No. 2. May, 1894.

The Victorian Naturalist:

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— OF —

The Field Naturalists' Club of Victoria.

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The Author of each article is responsible for the facts and opinions he records.

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1894.

Field Naturalists' Club of Victoria.

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BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 11th June, 1894, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Sassafras Gully, from Messrs. D. Best and C. Frost, F.L.S.

2. Election of Members.

   The following persons have been duly nominated for election at this meeting:—

	Proposer.	Seconder.
Mr. W. M. Hale ...	... Rev. W. Fielder	... Mr. H. P. C. Ashworth
Mr. J. J. E. Degen	... Rev. W. Fielder	... ... Mr. J. Kershaw

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

   1. Consideration of Annual Report and Balance-Sheet, 1893-94.
   2. Election of Office-Bearers for 1894-95.

      The following gentlemen have been duly nominated as Office-Bearers for the coming year:—

      President—Mr. H. T. Tisdall, F.L S.
      Vice-Presidents—Professor W. B. Spencer, M.A., Mr. F. G. A. Barnard.
      Hon. Treasurer—Mr. F. Wisewould.
      Hon. Librarian—Mr. E. Anderson.
      Hon. Secretary—Mr. H. P. C. Ashworth.
      Committee—Rev. W. Fielder, and Messrs. G. R. Hill, H. R. Hogg, T. S. Hall, M.A., C. Frost, F.L,S, J. Shephard, and G. Sweet.

      [*Only Five to be elected.*]

   3. Distribution of Prizes in connection with the Prize Competition for Natural History Specimens.

5. Reading of Papers and Discussions thereon.

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in minutes and *Naturalist.*

VOL. XI.—No. 3. JUNE, 1894.

The Victorian Naturalist:

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— OF —

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PUBLISHED JULY 5, 1894.

Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions he records.

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PRICE SIXPENCE.

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1894.

Field Naturalists' Club of Victoria.

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OFFICE-BEARERS, 1894-5.

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BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 9th July, 1894, at 8 p.m.

1. Correspondence and Reports.

Report of Excursion to Box Hill, from Mr. H. T. Tisdall, F.L.S.

2. Election of Members.

The following persons have been duly nominated for election at this meeting:—

	Proposer.	Seconder.
Miss Hebden	Rev. W. Fielder ...	Miss Chambers
Mr. R. J. Fletcher	Rev. W. Fielder ...	Mr. H. P. C. Ashworth
Mr. W M'Caw	Rev. W. Fielder ...	Mr. F. Pitcher
Mr. E. R. Peacock	Rev. W. Fielder ...	Mr. H. P. C. Ashworth

3. Nominations for Membership.

Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

The election of Treasurer in place of Mr. F. Wisewould, resigned.
Mr. C. Frost, F.L.S., has been duly nominated, and will offer himself for election.

5. Reading of Papers and Discussions thereon.

By Mr. W. H. Ferguson, "Evidence of the Antiquity of Man in Victoria."
By Mr. H. T. Tisdall, F.L.S., "Notes on the genus Calocera with reference to a supposed new species."

6. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in minutes and *Naturalist.*

VOL. XI.—No. 4. JULY, 1894.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

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Hon. Editor of the "Victorian Naturalist:"
MR. F. G. A. BARNARD, Bulleen Road, Kew.

Committee: REV. W. FIELDER, MR. T. S. HALL, M.A., MR. G. R. HILL, MR. J. SHEPHARD and Mr. G. SWEET.

OBJECTS.

THIS CLUB was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 13th August, 1894, at 8 p.m.

1. Correspondence and Reports.

2. Election of Members.

The following persons have been duly nominated for election at this meeting:—

	Proposer.	Seconder.
Mr. D. B. Ferguson	... Mr. W. H. Ferguson ...	Mr. H. P. C. Ashworth
Mr. R. Harvie ...	... Mr. W. Stickland ...	Mr. J. Stickland
Mr. A. H. Westley	... Mr. J. Gabriel ...	Mr. C. French, sen.

3. Nominations for Membership.

Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

5. Reading of Papers and Discussions thereon.

By Rev. Walter Fielder—"A Study of Professor Drummond's 'Ascent of Man.'"

6. Reading of Natural History Notes.

"Should Magpies be protected?" All interested are invited to contribute to a discussion on this subject.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

Field Naturalists' Club of Victoria.

MEETING FOR PRACTICAL WORK.

The Monthly Meeting for Practical Work will be held on Monday Evening, 27th August. The "Pine Tree" will be the type studied under the direction of Mr. J. Shephard. Members attending the meetings are requested to provide themselves with the "Introduction to the Study of Botany," by Dr. Dendy, F.L.S., and Mr. A. H. S. Lucas, M.A., B. Sc., and with a microscope and necessary accessories. As this is the last meeting of the Botanical course, suggestions are invited for future meetings in other lines of study.

SPECIAL NOTICES.

Members who have not already paid their subscriptions for the current year are requested to forward them at the earliest convenience to the Hon. Treasurer (Mr. C. Frost, Mont Victor Road, East Kew), who will, in future, receive subscriptions, and keep all accounts relating to the financial affairs of the Club.

EXCURSIONS.

SATURDAY, 18TH AUGUST.—Cheltenham, under the leadership of Messrs. J. Shephard and C. French, junr. Start from Prince's Bridge Station at 1.10 p m. Objects :—Botany and Pond Life.

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Members are reminded that the Club's year ended 30th April last, and that subscriptions (15s.) for 1894–5 are now due, and must be paid on or before 11th June in order to entitle members to vote at the Annual Election of Office-bearers, which takes place on that day. The Hon. Treasurer (Mr. F. Wisewould, 93 William Street, Melbourne) will be glad to receive such subscriptions.

MEETING FOR PRACTICAL WORK

The Monthly Meeting for Practical Work will be held on Monday Evening, 23rd July. The "Bean Plant" will be the type studied under the direction of Mr. J. Shephard. Members attending the meetings are requested to provide themselves with the "Introduction to the Study of Botany," by Dr. Dendy, F.L.S., and Mr. A. H. S. Lucas, M.A., B. Sc., and with a microscope and necessary accessories.

EXCURSIONS.

Owing to the Entomological department removing from the Exhibition Buildings, the excursion set down in the programme for July 14th, has been postponed. Members are invited to send in suggestions to help in framing the Programme of Excursions for 1894–5.

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Field Naturalists' Club of Victoria.

SPECIAL NOTICES.

The Annual Conversazione will be held in the Athenæum, on the 14th and 15th inst. Members are urgently requested to make the exhibition of specimens as complete as possible, and to send in particulars of their exhibits not later than the 11th inst. Extra tickets may be obtained from the Hon. Secretary at One Shilling each, and members are requested to do their utmost to assist the Club by disposing of as many tickets as possible.

Members are reminded that the Club's year ended 30th April last, and that subscriptions (15s.) for 1894-5 are now due, and must be paid on or before 11th June in order to entitle members to vote at the Annual Election of Office-bearers, which takes place on that day. The Hon. Treasurer (Mr. F. Wisewould, 93 William Street, Melbourne) will be glad to receive such subscriptions.

MEETING FOR PRACTICAL WORK

The Monthly Meeting for Practical Work will be held on Tuesday Evening, 26th June. The subject of Bacteria will be taken by Dr. T. Cherry. Members attending the meetings are requested to provide themselves with the "Introduction to the Study of Botany," by Dr. Dendy, F.L.S., and Mr. A. H. S. Lucas, M.A., B. Sc., and with a microscope and necessary accessories.

EXCURSIONS.

SATURDAY, 16TH JUNE.—Box Hill, under the leadership of Mr. H. T. Tisdall, F.L.S. Start from Prince's Bridge Station, at 1.15 p.m. Object :—Fungi.

PRIZE COMPETITION FOR NATURAL HISTORY SPECIMENS.

THE following is a list of the Prize-takers in the above competition, as adjudged by Messrs. F. G. A. Barnard, C. French, F.L.S., C. Frost, F.L.S. and H. T. Tisdall, F.L.S.

ZOOLOGY.

Class 2—MOLLUSCA—First Prize, C. J. GABRIEL.
,, 3—LEPIDOPTERA—First Prize, G. F. HILL.
,, 4—COLEOPTERA—First Prize, J. TURNBULL.
,, 5—HYMENOPTERA—First Prize, B. F. HILL.
,, 6—COLLECTION (illustrating Orders of Insects)—First Prize, B. F. HILL.
,, 7—COLLECTION (illustrating Life Histories of Insects)—Second Prize, B. F. HILL.

BOTANY.

Class 8—FLOWERING PLANTS—First Prize, ROSE ELLIOTT.
Second Prize, FREDERICK HIGGINS.
,, 9—FERNS, MOSSES AND FUNGI—First Prize, JOHN RUSSELL.
Second Prize, MARK ELLIOTT.

GEOLOGY.

Class 12—ROCKS AND MINERALS—Second Prize, FREDERICK HIGGINS.

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EXCURSIONS.

THURSDAY, 24TH MAY.—Sassafras Gully, under the leadership of Messrs. D. Best and C. Frost, F.L.S. Start from Prince's Bridge Station at 7 a.m. Object :—General Collecting.

MEETING FOR PRACTICAL WORK.

The Monthly Meeting for Practical Work will be held on Monday Evening, 28th May. The Botanical Course will be continued by Mr. J. Shephard, the Bracken Fern (*Pteris*) being the type chosen. Members attending the meetings are requested to provide themselves with the "Introduction to the Study of Botany," by Dr. Dendy, F.L.S., and Mr. A. H. S. Lucas, M.A., B. Sc., and with a microscope and necessary accessories.

SPECIAL NOTICES.

The Annual Conversazione will be held in the Athenæum, on the 14th and 15th June next. Members are urgently requested to make the exhibition of specimens as complete as possible. Intending exhibitors should hand in particulars of their exhibits to the Hon. Secretary before the end of the month to ensure their insertion in the catalogue.

A Prize Fund in connection with the juvenile competitions for Natural History Specimens has been started, and members are invited to contribute. Competitors will be advised shortly as to the latest date on which exhibits will be received.

As the financial year (1894–5) of the Club commences with this month, any person desirous of resigning his membership is requested to notify the Secretary to that effect and return this *Naturalist.*

Members are reminded that the Club's year ended 30th April last, and that subscriptions (15s.) for 1894–5 are now due, and must be paid on or before 11th June in order to entitle members to vote at the Annual Election of Office-bearers, which takes place on that day. The Hon. Treasurer (Mr. F. Wisewould, 93 William Street, Melbourne) will be glad to receive such subscriptions.

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Vol. XI.—No 5. August, 1894.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

PUBLISHED SEPTEMBER, 6, 1894.

Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions he records.

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Vice-Presidents: MR. F. G. A. BARNARD. PROF. W. B. SPENCER, M.A.

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BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 10th September, 1894, at 8 p.m.

1. Correspondence and Reports.

2. Election of Members.

   The following persons have been duly nominated for election at this meeting:—

	Proposer.	Seconder.
Mr. W. J. O'Neill ...	Mr. F. Pitcher ..	... Mr. J. Shephard
Mr. O. A. Sayce ...	Mr. F. G. A. Barnard	... Mr. C. Frost

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

5. Reading of Papers and Discussions thereon.

   By Mr. W. Stickland—"The Rotifer in Melbourne."

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

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BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 8th October, 1894, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Sandringham, from Mr. T. S. Hart, M.A.

   Report of Excursion to Frankston, from Mr. C. French, F.L.S.

2. Election of Members.

   The following person has been duly nominated for election at this meeting:—

	Proposer.	Seconder.
Miss A. Trickett ...	Mr. A. E. Kitson ..	... Mr. F. Pitcher

3. Nominations for Membership.

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   By Mr. G. A. Keartland—"Ornithology in Central Australia."

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Hon. Editor of the "Victorian Naturalist:"
MR. F. G. A. BARNARD, Bulleen Road, Kew.

Committee: REV. W. FIELDER, MR. T. S. HALL, M.A., MR. G. R. HILL, MR. J. SHEPHARD and Mr. G. SWEET.

OBJECTS.

THIS CLUB was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 12th November, 1894, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Bayswater, from Dr. W. Macgillivray.
   Report of Excursion to Springvale, from Rev. E. H. Hennell.
   Report of Excursion to Tarrawarra, from Mr. H. P. C. Ashworth.

2. Election of Members.

   The following persons have been duly nominated for election at this meeting:—

	Proposer.	Seconder.
Mr. Bickford ...	Mr. C. French ...	Mr. J. Tiller
Rev. E. W. C. Ferrall	Mr. D. Martin ...	Mr. C. French
Mr. J. Haase ...	Mr. A. Coles	Mr. C. French, jun.
Mr. C. M. Maplestone	Mr. F. G. A. Barnard	Mr. C. French
Mr. R. W. Wigmore	Mr. J. F. Bradly ...	Mr. H. P. C. Ashworth

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

5. Reading of Papers and Discussions thereon.

   By Professor W. B. Spencer, M.A.—"In Central Australia," illustrated by lantern views.

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

Vol. XI.—No. 8. November, 1894.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

PUBLISHED DECEMBER 6, 1894.

Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions he records.

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1894.

Field Naturalists' Club of Victoria.

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BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 10th December, 1894, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Werribee Gorge, from Mr. C. C. Brittlebank.
   Report of Excursion to Warrandyte, from Mr. D. Best.
   Report of Excursion to Plenty River, from Mr. D. Best.

2. Election of Members.

   The following persons have been duly nominated for election at this meeting:—

	Proposer.	Seconder.
Master Albie Best	Mr. D. Best ...	Mr. C. French.

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

5. Reading of Papers and Discussions thereon.

   By Mr. C. Frost, F.L.S.—"Note on the occurrence of Hoplocephalus nigrescens, a snake new to Victoria."
   By Mr. G. A. Keartland—"Ornithology in Central Australia, part 2."
   By Professor W. B. Spencer, M.A.—"Note on a rare marsupial from Central Australia."

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with writte particulars of their Exhibits, for record in Minutes and *Naturalist*.

Field Naturalists' Club of Victoria.

SPECIAL NOTICES.

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EXCURSIONS.

SATURDAY, 8TH DECEMBER.—Plenty River (viâ Preston), under the leadership of Mr. D. Best. Start from Spencer Street Station at 12.37 p m. Object: Entomology.

DECEMBER 22ND TO 26TH.—Phillip Island. Object: General Collecting. All who intend to join this excursion are requested to communicate with the hon. secretary at the next meeting.

SATURDAY, JANUARY 12TH, 1895.—Heidelberg, under the leadership of Mr. J. Shephard. Start from Collingwood Station at 2.15 p.m. Object: Pond Life.

SATURDAY, JANUARY 26TH.—Whittlesea, under the leadership of Mr. C. Frost, F.L.S. Start from Spencer Street Station at 10.35 a.m. Objects: Botany and Zoology.

SATURDAY, FEBRUARY 9TH.—Williamstown, under the leadership of the Rev. W. Fielder. Start from Spencer Street Station at 1.40 p.m. Object: Marine Zoology.

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Samples to be seen at Field Naturalist Club's Library. Write for further particulars.

Field Naturalists' Club of Victoria.

MEETING FOR PRACTICAL WORK.

The next meeting for Practical Work will be held on Monday evening, 26th November, when a second lesson in Taxidermy will be given under the direction of Mr. G. A. Keartland. It is proposed to undertake the mounting of birds on this occasion, and members who wish to try their hand at skinning are requested to provide themselves with knives, scissors, &c.

SPECIAL NOTICES.

Owing to difficulty in forming a sufficiently large party, the annual excursion (Mallacoota Inlet) has been postponed till next year.

Members who have not already paid their subscriptions for the current year are requested to forward them at the earliest convenience to the Hon. Treasurer (Mr. C. Frost, Mont Victor Road, East Kew), who will, in future, receive subscriptions, and keep all accounts relating to the financial affairs of the Club.

EXCURSIONS.

SATURDAY, 24TH NOVEMBER.—Warrandyte (viâ Ringwood), under the leadership of Mr. D. Best. Start from Prince's Bridge Station at 7 a.m. Object: General Collecting.

SATURDAY, 8TH DECEMBER.—Plenty River (viâ Preston), under the leadership of Mr. D. Best. Start from Spencer Street Station at 12.37 p.m. Object: Entomology.

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MEETING FOR PRACTICAL WORK.

At the next Meeting on Monday evening, 22nd October, Mr. G. A. Keartland will give a demonstration in skinning, preserving and mounting birds, etc. As the art of Taxidermy is essential to every Naturalist, this opportunity to acquire it should not be lost.

SPECIAL NOTICES.

SPECIAL EXHIBITS OF WILD FLOWERS

Are solicited for the meeting on the 8th inst. Messrs. F. G. A. Barnard ; C. French, F.L.S. ; T. S. Hall, M.A. ; and T. S. Hart, M.A., have been appointed a sub-committee to superintend the arrangements in connection with these exhibits. To ensure space being reserved, intending exhibitors should send their names and requirements to the Hon. Secretary as early as possible.

Members who intend to take part in the annual excursion to Mallacoota Inlet are requested to hand in their names to the Hon. Secretary as soon as possible.

Members who have not already paid their subscriptions for the current year are requested to forward them at the earliest convenience to the Hon. Treasurer (Mr. C. Frost, Mont Victor Road, East Kew), who will, in future, receive subscriptions, and keep all accounts relating to the financial affairs of the Club.

EXCURSIONS.

SATURDAY, 13TH OCTOBER.—Bayswater, under the leadership of Dr. W. Macgillivray. Start from Prince's Bridge Station at 1.35 p.m. Object : Ornithology.

SATURDAY, 27TH OCTOBER.—Springvale, under the leadership of the Rev. E. H. Hennell. Start from Prince's Bridge Station at 1.30 p.m. Object : Entomology.

TUESDAY, 6TH NOVEMBER.—Tarrawarra, under the leadership of Mr. H. P. C. Ashworth. Start from Prince's Bridge Station at 7 a.m. Object : General Collecting.

SATURDAY, 9TH NOVEMBER.—Werribee Gorge, under the leadership of Mr. C. C. Brittlebank. Start from Spencer Street Station at 9.40 a.m. Objects : Ornithology and Geology.

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Field Naturalists' Club of Victoria.

MEETING FOR PRACTICAL WORK.

A Meeting for Practical Work will be held on Monday evening, 24th inst., when Rev. W. Fielder will give a demonstration on *Amphioxus*. Members attending the meeting are requested to provide themselves with a microscope and necessary accessories.

SPECIAL NOTICES.

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EXCURSIONS.

SATURDAY, 22ND SEPTEMBER.—Sandringham, under the leadership of Mr. T. S. Hart, M.A. Start from Flinders Street Station at 1.40 p.m. Object: Botany.

SATURDAY, 29TH SEPTEMBER.—Frankston, under the leadership of Mr. C. French, F.L.S. Start from Prince's Bridge Station at 12.20 p.m. Object:—Botany.

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1895.

Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 14th January, 1895, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Phillip Island, from Mr. H. P. C. Ashworth.

2. Election of Members.

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

5. Reading of Papers and Discussions thereon.

   By Messrs. H. P. C. Ashworth, and D. Le Souëf.—"Albatross Island and the Hunter Group." Illustrated by lime-light views.

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

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SATURDAY, JANUARY 26TH.—Whittlesea, under the leadership of Mr. C. Frost, F.L.S. Start from Spencer Street Station at 10.35 a.m. Objects: Botany and Zoology.

SATURDAY, FEBRUARY 9TH.—Williamstown, under the leadership of the Rev. W. Fielder. Start from Spencer Street Station at 1.40 p.m. Object: Marine Zoology.

MEETING FOR PRACTICAL WORK.

At the Monthly Meeting for Practical Work, to be held on Monday evening, 28th January, the President, Mr. H. T. Tisdall, F.L.S., will take the subject of "Hymenomycetes." The identification, collection, and preservation of the larger fungi will be dealt with, and the edible species indicated. Members attending the meeting are requested to provide themselves, if possible, with a microscope and accessories.

VOL. XI.—NO. 10. JANUARY, 1895.

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— OF —

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PUBLISHED FEBRUARY 7, 1895.

Editor: F. G. A. BARNARD, Esq.

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Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 11th February, 1895, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Williamstown, from Rev. W. Fielder.

2. Election of Members.

3. Nominations for Membership.

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4. General Business.

5. Reading of Papers and Discussions thereon.

   By Mr. H. T. Tisdall, F.L.S.—"Walhalla, as a Collecting Ground."

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

EXCURSIONS.

SATURDAY, 9TH FEBRUARY.—Williamstown, under the leadership of Rev. W. Fielder. Start from Fli ders Street Station at 1.25 p.m. Object: Marine Zoology.

SATURDAY, 23RD FEBRUARY.—Moonee Valley, *viâ* Moonee Ponds, under the leadership of Mr. G. Sweet, F.G.S. Start from Flinders Street Station at 1.40 p.m. Object: Geology.

SATURDAY, 16TH MARCH.—Willsmere, *viâ* Kew, under the leadership of Messrs. W. and J. Stickland. Start from Prince's Bridge Station at 1.30 p.m. Object: Pond Life.

MEETING FOR PRACTICAL WORK.

The next Meeting will be held on 25th February, under the direction of Mr. H. T. Tisdall, F.L.S., who proposes to continue the subject of "Hymenomycetes." Members attending the Meeting are requested to provide themselves with a microscope and accessories.

Vol. XI.—No. 11. February, 1895.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

OF

The Field Naturalists' Club of Victoria.

PUBLISHED MARCH 6, 1895.

Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions he records.

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1895.

Field Naturalists' Club of Victoria.

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA ST., MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 11th March, 1895, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Moonee Valley, from Mr. G. Sweet, F.G.S.

2. Election of Members.

   The following person has been duly nominated for election at this meeting:—

	Proposer.		Seconder.
Mr. Jas. Weddells...	Mr. J. E. Prince	...	Mr. C. French, jun.

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

5. Reading of Papers and Discussions thereon.

   By Professor Baldwin Spencer, M.A.—"Collecting Notes from Central Australia."

   By Mr. H. Kendall.—"Notes of a Naturalist in Queensland."

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

EXCURSIONS.

SATURDAY, 16TH MARCH.—Willsmere, *viâ* Kew, under the leadership of Messrs. W. and J. Stickland. Start from Prince's Bridge Station at 1.30 p.m. Object: Pond Life.

SATURDAY, 30TH MARCH.—Maribyrnong, *viâ* Ascot Vale, under the leadership of Mr. T. S. Hall, M.A. Start from Flinders Street Station at 2 p.m. Object: Geology.

MEETING FOR PRACTICAL WORK.

The next Meeting will be held on 25th March, and will be under the direction of Rev. W. Fielder, the subject chosen being the Tunicata. Members are requested to provide themselves with microscopes and dissecting instruments. Specimens to work upon will be supplied.

VOL. XI.—No. 12. MARCH, 1895.

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BUSINESS PAPER FOR MONTHLY MEETING.

Monday, 8th April, 1895, at 8 p.m.

1. Correspondence and Reports.

   Report of Excursion to Willsmere, from Messrs. W. and J. Stickland.

   Report of Excursion to Maribyrnong, from Mr. T. S. Hall, M.A.

2. Election of Members.

3. Nominations for Membership.

   Members making nominations will oblige by handing the full name and address to Hon. Secretary.

4. General Business.

   Mr. C. Egeberg Borchgrevink, the scientist who accompanied the *Antarctic* in her recent voyage to the South Polar regions will be introduced to the meeting by Baron von Mueller, K.C.M.G., and will give an outline of the Zoological results of the trip.

5. Reading of Papers and Discussions thereon.

   By Rev. E. H. Hennell.—"Notes on a Trip to Gippsland."

   By Mr. H. P. C. Ashworth.—"The Dispersal of Mistletoe."

6. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to mention the same at our meetings for the purpose of discussion.

7. Exhibition of Specimens and Conversazione.

   Members exhibiting specimens are requested to furnish the Hon. Sec. with written particulars of their Exhibits, for record in Minutes and *Naturalist*.

EXCURSIONS.

SATURDAY, 20TH APRIL.—Beaumaris, under the leadership of Rev. W. Fielder. Start from Flinders Street Station at 1.40 p.m. Objects: Marine Zoology and Geology.

FRIDAY, 24TH MAY.—Altona Bay, under the leadership of Mr. J. Gabriel, F.L.S. Start from the Gem Pier, Williamstown, at 10 a.m. Object: Dredging.

MEETING FOR PRACTICAL WORK.

The next Meeting will be held on Wednesday, 24th April, instead of Monday, 22nd. A second evening will be devoted to the Tunicata, under the direction of Rev. W. Fielder. Members are requested to provide themselves with microscopes and dissecting instruments.

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